OCTOBER, 1954

MODERN Machine Shop

Finally

A FIXTURE THAT MAKES FORM RELIEF PRACTICAL!

ROYAL OAK

UNIVERSAL FORM RELIEF FIXTURE

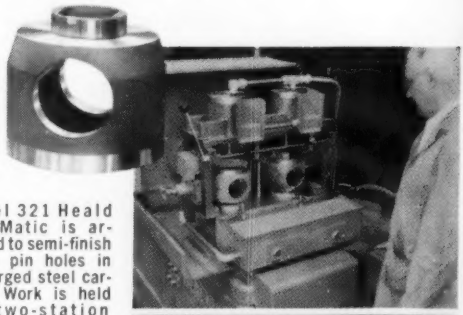
Radial, Axial & Combination Reliefs

SEE PAGE 30

OCTOBER MODERN MACHINE SHOP 1954

10,000 TONS AT A MILE A MINUTE!

... it will get where it's going a little sooner, a little safer, because this part ➧ got the FULL HEALD TREATMENT



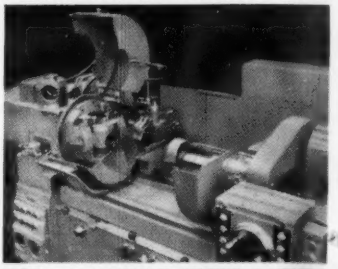
You're hitting the high iron at 60 per, with ten thousand tons of fast freight behind you. The huge, smoothly-purring diesels at your command have ample power and stamina to pull this tremendous load for hundreds of miles — with no interruptions, no unscheduled stops.

The tremendous power and long-haul dependability of modern diesel locomotives are a tribute to the skill and ingenuity of their makers. And precision finishing on Heald machines adds much to the stamina and perfect functioning of many vital diesel parts. Here, for example, is a piston pin carrier that is processed on *all three* basic Heald machines — as shown at the right.

Whenever a part is precision finished on Heald equipment you can be sure of three things. A finer, longer-lasting, precision made part. Important savings in time and production cost. A definite competitive advantage for your product. That's why IT PAYS TO COME TO HEALD.

Model 321 Heald Bore-Matic is arranged to semi-finish piston pin holes in the forged steel carriers. Work is held in a two-station hydraulic clamping fixture and radial locaters are interlocked to insure proper location.

Model 272 Gage-Matic Internal finish grinds the piston carriers. The work is held in an angle plate fixture with hand clamping; location is by pins in locating holes in piston carrier skirt.



Model 261 Rotary Surface Grinder finishes the shoulder of the piston pin carrier to provide flat smooth surface. The work is held on a radial pole magnetic chuck with a retainer ring.

THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

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MODERN Machine Shop

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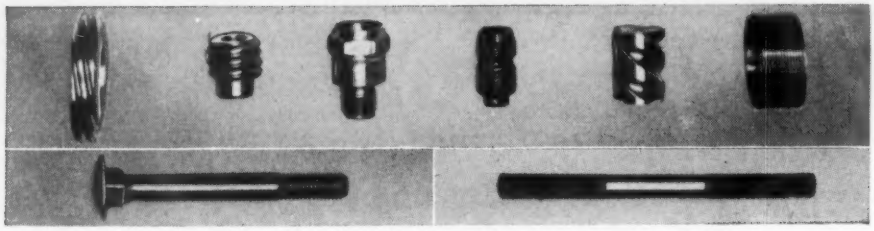
Member BPA NBP

A Demonstration of the

LANDIS

Thread Rolling Machine



on your workpieces

The new LAN-HY-ROL Thread Rolling Machine offers a combination of precision, productivity, and flexibility in generating external threads unequalled by any other machine now available in the Western Hemisphere. Yet we believe that its superiority is so great that its unlimited potentialities cannot be understood without seeing actual operation.

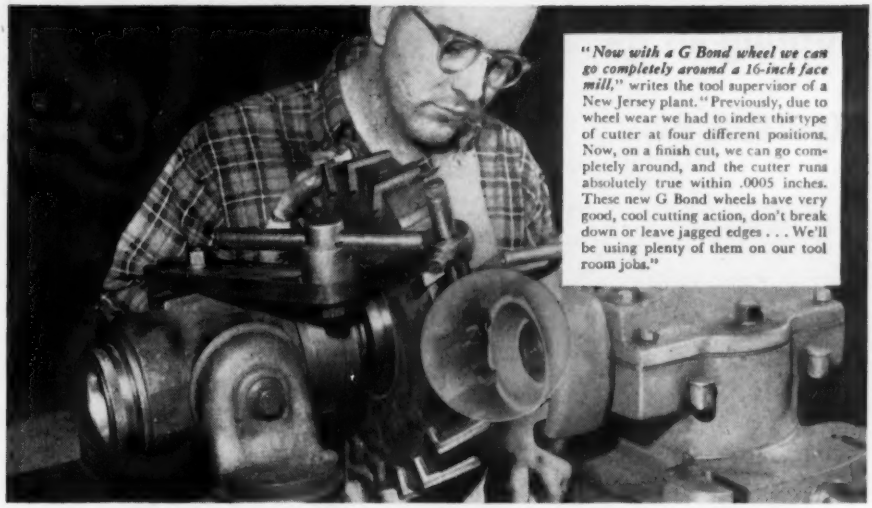
Therefore, we are offering all manufacturers an operating demonstration of the new LAN-HY-ROL, using your own workpieces if you prefer. Send us the necessary thread specifications and prepared workblanks—we will make the dies required at our own expense, then arrange an operating demonstration here in Waynesboro at your convenience.

The new LAN-HY-ROL is based on a rolling system using two circular thread rolling dies and a work support blade. It will produce UNC and UNF threads to tolerances up to and including Class 4, and will also roll Acme, worm, and other special threads. The LAN-HY-ROL will roll threads from $\frac{5}{16}$" to 3" in diameter up to $5\frac{7}{8}$" long by plunge rolling, and up to 72" by thrufeed rolling. It can also be equipped for automatic hopper feeding, semi-automatic hand feeding, or rolling special threads between centers.

Plan today to investigate the cost-saving advantages of the new LAN-HY-ROL Thread Rolling Machine. Contact us direct in Waynesboro, or through one of our field representatives, about arranging a demonstration.

LANDIS *Machine* COMPANY

410 WAYNESBORO • PENNSYLVANIA • U. S. A.



"Now with a G Bond wheel we can go completely around a 16-inch face mill," writes the tool supervisor of a New Jersey plant. "Previously, due to wheel wear we had to index this type of cutter at four different positions. Now, on a finish cut, we can go completely around, and the cutter runs absolutely true within .0005 inches. These new G Bond wheels have very good, cool cutting action, don't break down or leave jagged edges . . . We'll be using plenty of them on our tool room jobs."

New G BOND sets new records in tool room grinding

Here's Proof... Users praise the many "TOUCH of GOLD" *advantages in Norton pace-setting wheels*

Norton G Bond wheels have sure started something! In tool and cutter grinding, as in many other forms of precision and semi-precision grinding, they're giving users an entirely new slant on how efficient, long-lasting and profitable wheels can be.

What Users Say About New G Bond Wheels

"Good finish, longer wheel life."

"Heavier feeds without burn."

"Run absolutely true."

"No breakdown—no jagged edges."

"Cut freely, hold shape with no burning."

"They show how a real wheel will cut."

G Bond Alundum* Wheels In Your Own Tool Room

will take heavier cuts in expensive, heat-sensitive steels without drawing temper. They'll reduce tool spoilage, give you closer tolerances and smoother finishes than you ever got before — with fewer wheel changes and machine adjustments . . . Those are the value-adding, money-saving "Touch of Gold" advantages that make G Bond wheels outperform any others you ever used.

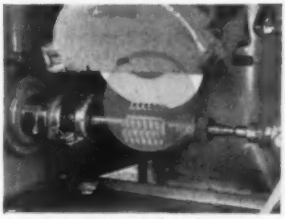
Your Norton Distributor

can recommend the right G Bond wheels for your jobs. Contact him or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

W-1532

NORTON
ABRASIVES
Making better products... to make other products better

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries



"Better cut and less burn than previous Norton or other make wheels. We're re-ordering 250 G Bond wheels," was the comment from this Ohio tool company.

"We're using heavier feeds with G Bond wheels—and getting faster sharpening."

Nothing to get out of order...

accurate every time

NEW series of WILLIAMS® TORQUE MEASURRENCHES®

B-58A B-58 S-58A S-58

No.	Capacity	Length
BANTAM — 3/8" Square Drive		
B-58A	0 to 150 in. lbs.	12¼"
B-58	0 to 600 in. lbs.	15½"
STANDARD — ½" Square Drive		
S-58A	0 to 100 ft. lbs.	18"
S-58	0 to 200 ft. lbs.	19⅞"

• *Available individually boxed or as a complete set T4-58 in metal case.*

• Never a doubt about the accuracy of these new Torque MEASURRENCHES®. No worry about hard use, even abuse, that upsets delicate dials, gears and levers. When you sight-read Williams patented time-proved converging scale . . . you can depend upon what you see.

These precision machined wrenches are made of heat-treated, selected alloy steels. They give years of trouble-free service.

Experienced design combines proportional balance and light weight to accent "feel". Finish is in chrome with calibrated areas buffed. Ask for folder A-460.

Looking for a superior reversible ratchet model? Ask your distributor for Williams S-57. Both sight and sound readings in one.

WILLIAMS INDUSTRIAL TOOLS

"The Broadest Line of Its Kind"

PLUS **local service from a Williams Distributor.**

J. H. WILLIAMS & CO.
408 Vulcan Street
Buffalo 7, N. Y.

Farrel® speed reducers can be relied on for dependable operation where conditions of service are unusual and exacting. The ability to adapt these units to specific requirements results from design experience gained by successfully solving innumerable problems requiring freedom in gear judgment.

To suit the application, the gears and pinions of Farrel speed reducers can be proportioned to meet specific load, speed and service conditions . . . input and output shafts can be varied in size, in material and in extension . . . housing dimensions can even be changed to meet problems in mounting.

Farrel supplies these units in a wide range of ratios and capacities. Designs include single, double, and multiple reduction units, speed-change units having two or more selective speeds, right angle drives, and drives to meet special requirements. Ask for Bulletin 449.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Akron, Detroit, Chicago, Memphis, Minneapolis, Fayetteville (N. C.), Los Angeles, Salt Lake City, Tulsa, Houston, New Orleans

FB-963

CUT AWAY METAL FROM INTERNAL CYLINDERS "MOSTEST AND FASTEST" WITH

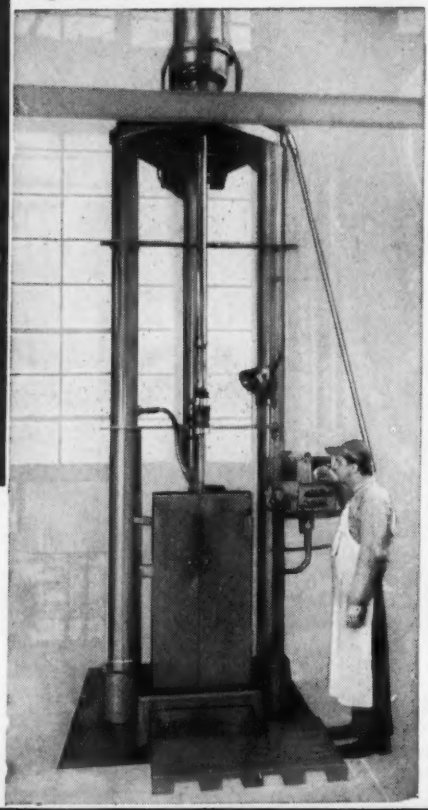
FULMER HONING MACHINES

ACCURACY

self-aligning hones remove rough spots of the internal surface and then hone the bore to tolerances up to .0001" (±) on ferrous, non-ferrous metals, plastics, glass, etc.

SPEED

exact, uniform, constant, removes up to 1/16" from diameter at 1½ to 2 cu. in. per min. Fastest, most economical honing, always dependable.



Why Shop Around?

FULMER supplies "everything in one package": Honing Machine, Hones, Stones, Fixtures, Tools.

Photo taken in plant of The Frank G. Hough Co., Libertyville, Illinois, world's largest tractor-shovel makers.

Get your copy of our honing bulletin

C. ALLEN FULMER CO.

1233 First National Bank Bldg. Cincinnati 2, Ohio

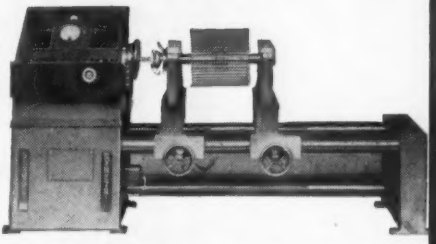
the final *check* for every rotating part...

Maybe it's a crankshaft or an armature ... perhaps a fan or a belt pulley. No matter. The important thing is this: If it isn't *balanced,* it isn't ready for service.

Smooth operation and long life require that accurate static and dynamic balance be rated right along with mechanical specifications to assure the efficiency of the finished product.

Gisholt Balancing Machines can locate and measure unbalance vibrations down to .000025" with simple readings ... handle any assembly from ½ ounce to 50 tons.

The cost? Very moderate. Let Gisholt Balancing Machines provide the final check. Write us.



The Gisholt Type 3U Balancer shown here is capable of balancing rotating parts or assemblies weighing from 50 to 1000 pounds. Other sizes and types are available to answer any balancing problem. Gisholt Balancers can also be furnished with correction equipment to meet your own specific requirements.

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

DYNETRIC BALANCERS — GISHOLT

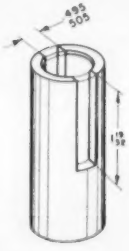
DEVELOPED JOINTLY WITH WESTINGHOUSE ELECTRIC CORPORATION
"DYNETRIC" IS A TRADE MARK REG. U. S. PAT. OFFICE BY WESTINGHOUSE ELECTRIC CORPORATION

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

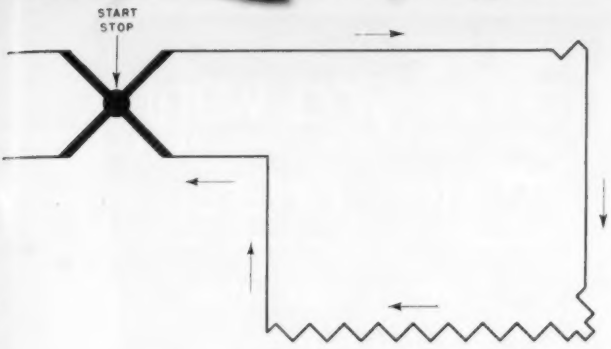
CINCINNATI No. 2-24
Plain Automatic Rise and Fall Milling Machine tooled up to mill a deep slot in couplings. A sample coupling is shown on the right-hand fixture.

Drawing of part and production data:

Part name	Coupling
Material	Steel
Stock removal	From solid
Cutting speed	76 feet per minute
Feed	3½ inches per minute (one cut)
Production	112 couplings per hour



CIN
MILLING MACHINES • CUTTER MACHINES • FLAME HARDENING



Automatic cycle for a cost-reducing setup on a CINCINNATI No. 2-24 Automatic Rise and Fall Miller.

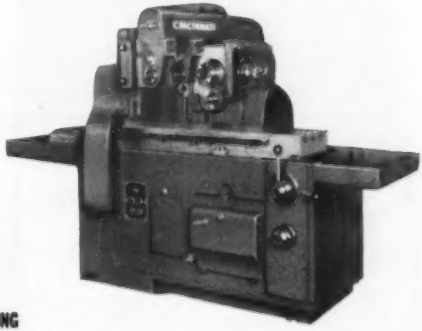
CINCINNATI

X signature for safe operation

In the two-position automatic milling cycle diagramed here, X indicates complete safety for the operator. It's an automatic stop position for the cutter rotation, table traverse, and coolant . . . giving the operator ample time to safely load and unload the fixtures. This is a standard feature of CINCINNATI No. 2-24 Automatic Milling Machines. ¶ The equipment illustrated is a complete production package by Cincinnati. The milling operation itself, mill ½" slot 1⅝" deep in couplings (see part drawing), is rather simple, but to keep the cost at the very lowest, our Application Engineers chose the Rise and Fall style machine, and equipped it with two three-station hydraulically operated fixtures. ¶ Whether your milling operations are simple or complex, you can do them better and at lower cost on a CINCINNATI. For brief data on the No. 2-24 line, look in Sweet's Machine Tool Catalog. Complete information may be obtained by writing for catalog No. M-1760.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

CINCINNATI No. 2-24 Plain Automatic Rise and Fall Milling Machine. Catalog No. M-1760.



CINNATI

SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

If you want a jig borer...

better see the *plus* features in the KNIGHT No. 50

★

SPECIFICATIONS

- Spindle speeds, 16—40 to 2000 RPM
- Boring feeds, —infinitely variable, .0000"—.010"
- Vertical capacity—28"
- Table travel—longitudinal 28", cross 18"
- Table feeds—dial type, 16
- Table feeds—per minute, 5" 16" to 20"
- Table rapid traverse—both directions, 100"
- Horsepower—7½
- Weight—8100 lbs.

The BIG ADVANTAGE of the Knight No. 50 lies not only in its ability to do precision boring and drilling, but in its versatility for performing a wide range of other difficult milling and machining operations without transferring the workpiece from one machine to another. Much of the layout work and preliminary drilling are eliminated, and the whole job is finished quicker on the No. 50.

In addition to making work transfers unnecessary, setup time is reduced by half or more—output is greatly increased—and fewer high-priced manhours are required on each job.

Exclusive on the No. 50 is the dial-controlled infinitely variable spindle feeds. Extra-long travel of the precision roller bearing-mounted one-piece spindle gives this versatile machine another plus feature. Extra-rugged and careful construction promise exceptional accuracy. Convenient quick-action controls and full-vision work areas make operation simple and easy.

KNIGHT VERSATILE MILLERS ACCURATE · RIGID

W. B. KNIGHT MACHINERY COMPANY
3922 W. Pine Blvd. · St. Louis 8, Mo.

ATTACH TO COMPANY LETTERHEAD

Send catalog on No. 50 and other Knight boring and milling machines.

Name .....

Title .....

☐ Send data on Knight's 20" & 42" Rotary Tables.

Send Coupon For Catalog

PRECISION AUTOMATIC FLEXOPRESS

HIGH SPEED with a HIGH DEGREE of ACCURACY

OTHER PRESSES GAUGE THE FEED FROM PREVIOUSLY PIERCED MATERIALS

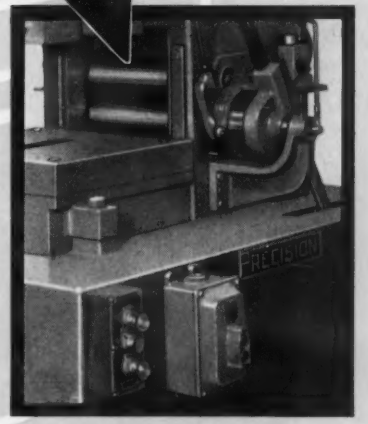
Other presses must pull the material and are therefore gauging the feeds from previously pierced materials which presents a problem in feed accuracy.

15
30
50
TONS

Precision
AUTOMATIC FLEXOPRESS
PUSHES FLIMSY
Materials into the
DIE AREA AT
HIGH SPEED...

In view of the fact, that the feed mechanism is an integral part of the press it is possible to place the feed close to the die area. This permits the Flexopress to push light, flimsy materials such as lead, soft copper, aluminum foil, shim stock and other materials of similar nature into the die at high speed with a high degree of accuracy.

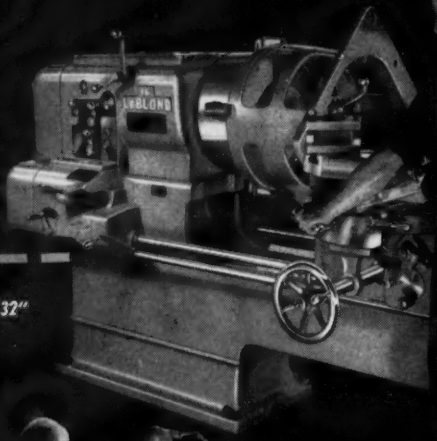
350 to 600
Strokes Per Minute



PRECISION WELDER & FLEXOPRESS CORP.

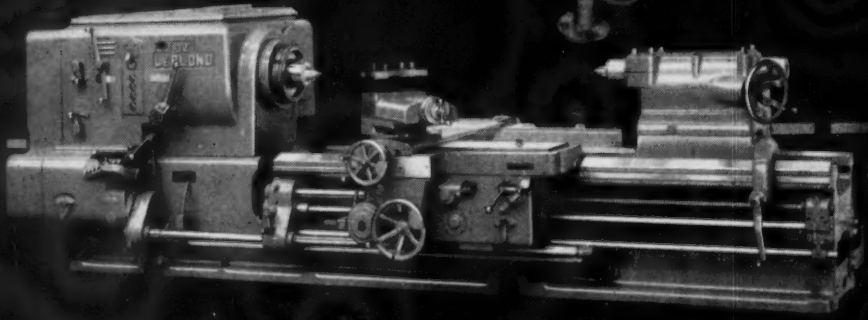
138 E. McMICKEN AVE. - CINCINNATI 10, OHIO

LeBlond sliding



16"/32"

16"/32"



32"/50"

bed gap lathes

4 Sizes, 16"/32", 25"/50", 32"/60" Heavy Duty & 17"/28" Regal

The most versatile lathes in the world give you:

Variable gaps for work with large projections

Occasional work with large or irregular projections doesn't warrant buying a large-swing lathe. And extra-long pieces that have to be turned now and then don't justify the cost of a long-bed machine. That's why tool rooms, maintenance departments and contract shops depend on LeBlond Sliding Bed Gap Lathes for *both* out-sized jobs and everyday engine lathe work.

Here's how they work. LeBlond Sliding Bed Gap Lathes are built with two bed sections. The top bed is movable on the lower. With the top bed extended, a wide gap is created providing nearly twice the swing of a conventional engine lathe. Center distance can also be increased greatly allowing long lengths to be turned. With the gap closed this triple-duty lathe does all the work of a heavy-duty engine lathe of comparable size.

LeBlond Sliding Bed Gap Lathes come in four sizes. Three heavy-duties, the 16"/32", 25"/50" and 32"/60"; and a low-cost 17"/28" Regal. These lathes will give you swings up to 61½" and up to 13' distance between centers (base).

Adjustable center distance for extra-long work

And, of course, you get all the well-known LeBlond features. Hardened and ground steel bed ways; low-friction, high-power Spur Gear headstock; totally enclosed quick-change box; automatic lubrication; one-piece apron; thrust-lock tailstock, and many more.

For complete description and specifications of the 16"/32", 25"/50" and 32"/60" heavy duties ask for Bulletin SBG-103 E. 17"/28" Regal, Bulletin RSBG1 E.

Where utmost versatility is what you need in a lathe, you can't do better than a LeBlond Sliding Bed Gap. Whatever your turning needs may be, one of LeBlond's 76 models is bound to suit. Contact your nearby LeBlond Distributor or write Cincinnati today.

Capacity for all regular engine lathe work

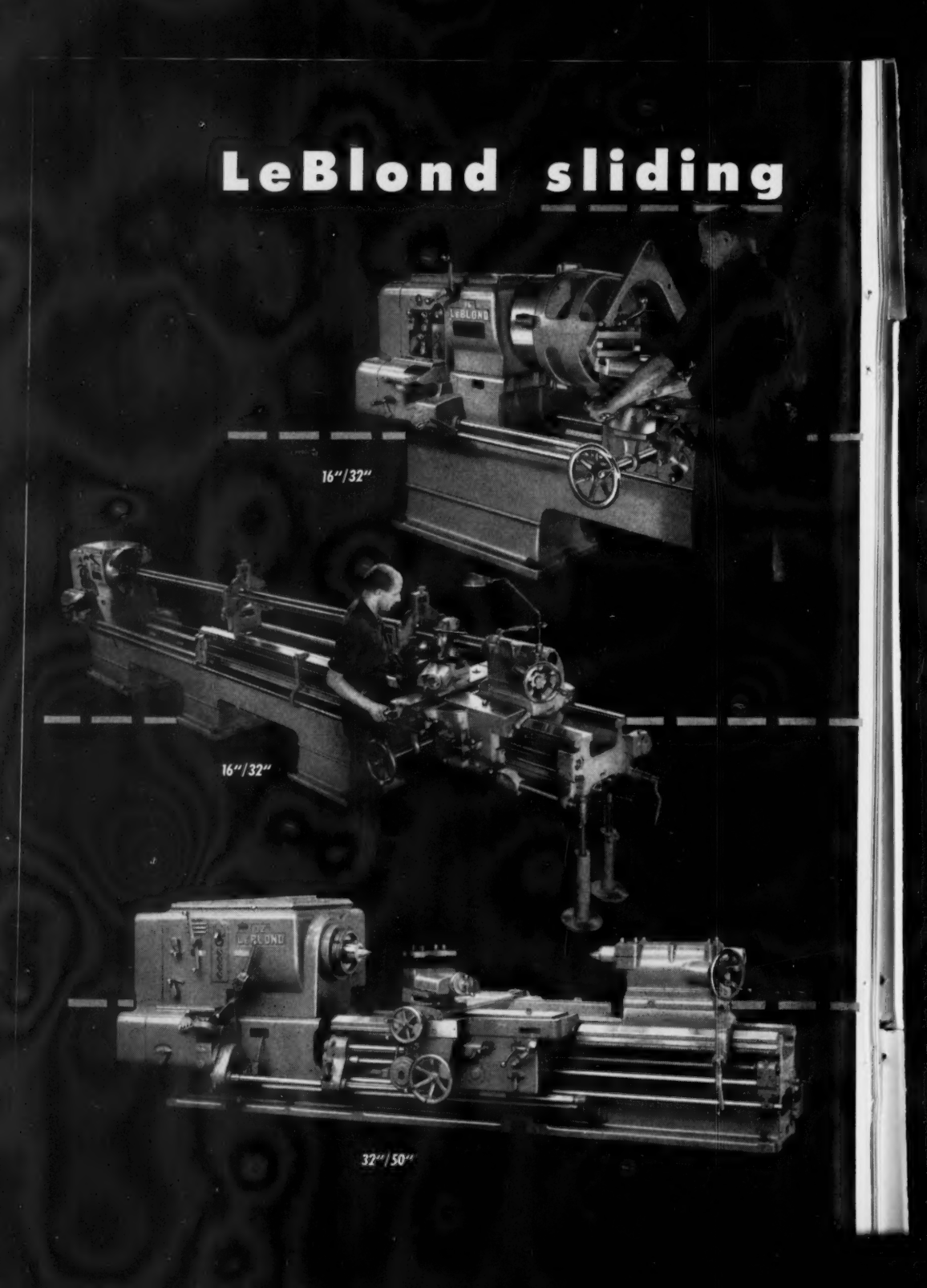
....turned faster by

LEBLOND *of Cincinnati*

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • *FOR MORE THAN 67 YEARS.*

LeBlond sliding



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.... turned faster by

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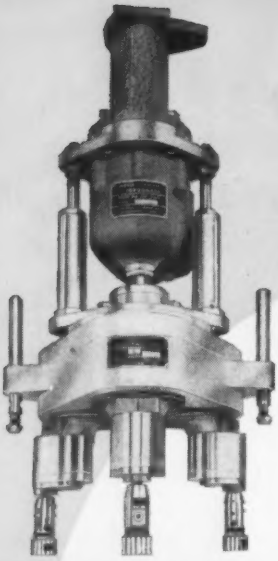
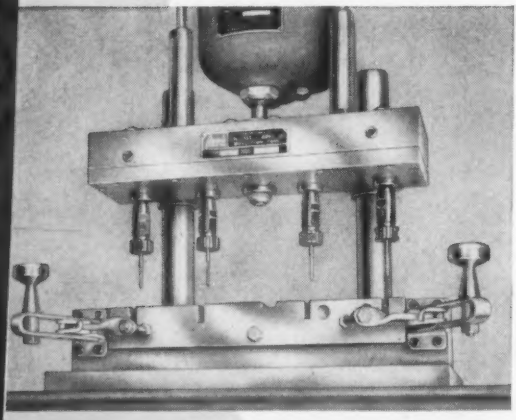
WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • *FOR MORE THAN 67 YEARS.*



Jarvis MULTI-TAPPERS

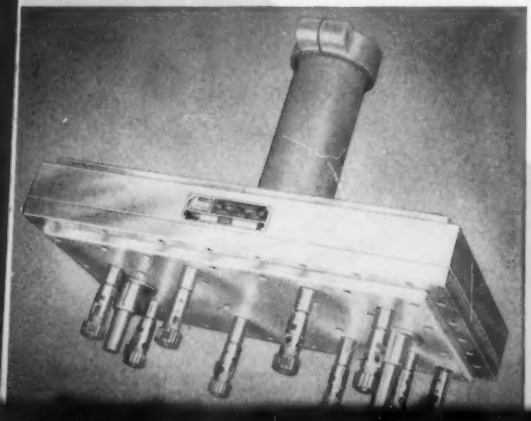
AN INDUSTRIAL MACHINE FOR INDUSTRIAL USERS



For Multiple Tapping and Drilling

Engineered and built to your specific production requirements from our basic standard components, Jarvis Multi-Tappers can be furnished for any type of drill press available.

We invite your inquiries—let us assist in analyzing your tapping and drilling needs!



Send for our catalog featuring Jarvis Multi-tappers

WHEN POWERED WITH A JARVIS TORQOMATIC DRIVE THE JARVIS MULTI-TAPPER PROVIDES THE MOST EFFICIENT AND PRODUCTIVE MACHINE IN THE FIELD.

THE CHARLES L. JARVIS COMPANY

MIDDLETOWN IN CONNECTICUT

Jarvis TAPS

AN INDUSTRIAL TAP FOR INDUSTRIAL USERS

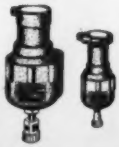
have "Custom Made" Cutting Edges at NO EXTRA CHARGE

"Custom Made" means just that! Accurate indexing and precision machine grinding of flute and spiral points on Jarvis Taps produce a tool in which ALL the cutting edges do their share of the work. Our highly accurate fluting process makes it possible for us to control for your PARTICULAR NEEDS the amount of hook ground in the flutes. Specify Jarvis, and you'll always have "Custom Made" Taps designed to do a specific job superbly well.

Send for complete New 56 page Tap Catalog and Manual.

Jarvis Manufacturers of · · TAPS

TORQOMATICS



MULTI-TAPPING AND DRILLING

CARBIDE TOOLS

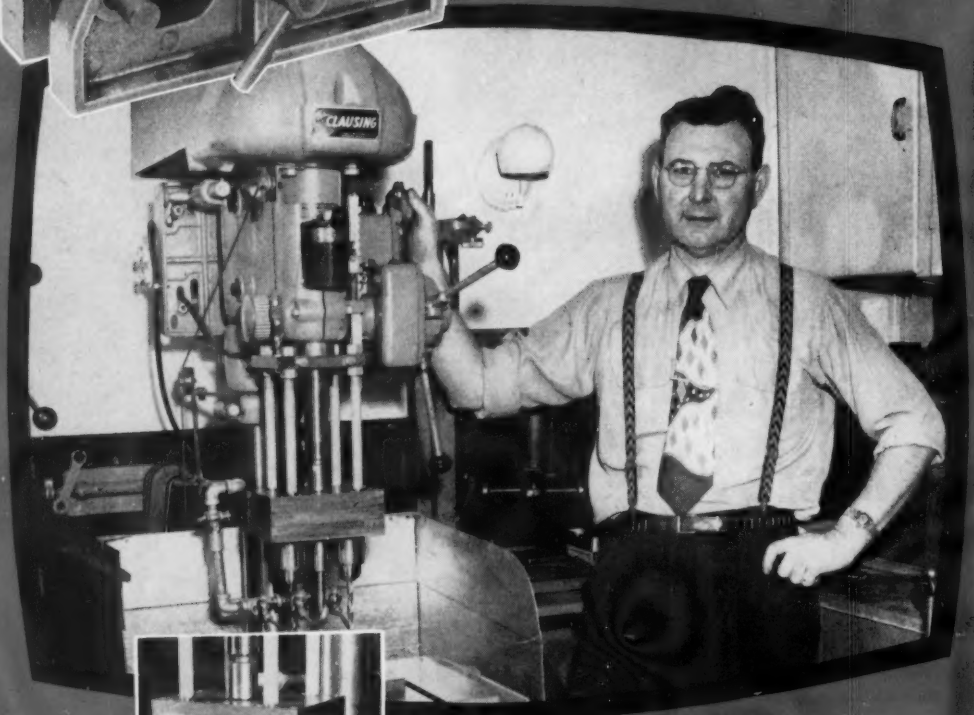
FLEXIBLE SHAFT MACHINES

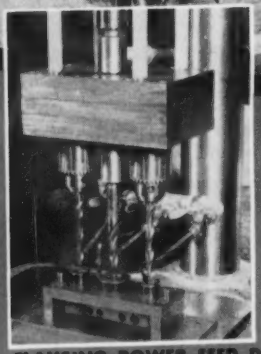
ROTARY FILES & MOUNTED POINTS

THE CHARLES L. JARVIS COMPANY, MIDDLETOWN IN CONNECTICUT

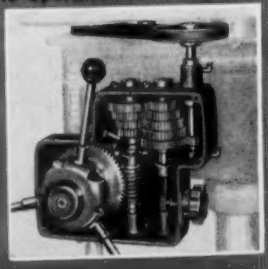
WHY

DOWL IT . . . first and only *self-centering* dowel drill guide. Invented and perfected by Clifton Wellman of Hastings, Mich. Assures perfect alignment of dowel holes in 5 drill sizes . . . ¼" to ½". For metal as well as wood. A boon to machine shops.





Wellman's big job was accurately locating and drilling guide holes and vise screw hole. To do this he designed and built his own multiple drill head, locating and drilling three holes in one operation and two in another. Three hole operation is illustrated.



CLAUSING POWER FEED DRILL PRESS exactly suited Wellman's requirements. He liked its bigger tool and job capacity; the efficiency of CLAUSING'S power feed with positive gear drive instead of belts; oil bath lubrication and dial feed selection; overall heavy duty construction and accurate performance.

Wellman CHOSE THE 18" CLAUSING POWER FEED DRILL PRESS TO SPEED PRODUCTION OF SELF-CENTERING DOWEL DRILL GUIDES

Drilling ½" holes through 1-½" deep, ⅝" thick cold rolled, case hardened steel is a tough assignment for any drill press. By using a specially designed head with three permanently spaced chucks, Wellman does different operations on the same job with his CLAUSING, by changing the drill sizes and using two or three of the chucks. The combination of the CLAUSING and this head, speed his production about one-third. "My new CLAUSING really does a slick job," says Wellman, "and with POWER FEED the tough steel yields like butter."

Study these CLAUSING PLUS VALUES

Capactiy 1" in cast iron, ¾" in steel. 6½" spindle travel for efficient use of production chucks. 63/64" diameter spindle with choice of No. 3 M.T. nose, ¾" or 17/32" Jacobs chuck. 39" maximum distance spindle to table. 50" maximum distance spindle to base. Motor: ¾ to 1½ H.P. ⅝" B-section belt for efficient transmission of power. Speed range with 1725 RPM motor — 390, 650, 1100, 1850, 3000. With 1140 RPM motor — 250, 480, 800, 1200, 1950. Four ball bearing drive, with 3 sealed-for-life and 1 double-row, double-shielded ball bearings. Both races in double row bearing absorb drill thrust. Exclusive Vernier depth stop with control accurate to .001". Position mechanism, furnished, moves BOTH head and table. Double coordinate locks on head and table.

With POWER FEED — The Greatest CLAUSING Ever!

The new Plus Value CLAUSING 18" Drill Press sets new standards in tool and job capacity, and performance. And with POWER FEED it becomes an outstanding value for production, tool room or general drill operations. Its heavy-duty GEAR DRIVEN power feed is positive and sure with no belt slippage to dissipate power. Drive is through four sets of change gears, worm, worm gear. Instant feed selection by dial — no belts to position. Steel change gears with ½" face. Hardened stress-proof steel worm. Bronze worm gear with ¾" face. Gears run in bath of oil. Heavy-duty Oilite bearings, with ball thrust bearing on worm shaft.

Make any comparison you wish. But by all means COMPARE. Then your first choice is bound to be CLAUSING. Your experienced ATLAS-CLAUSING Dealer will gladly help you solve any special problems you may have.

Atlas CLAUSING *the*

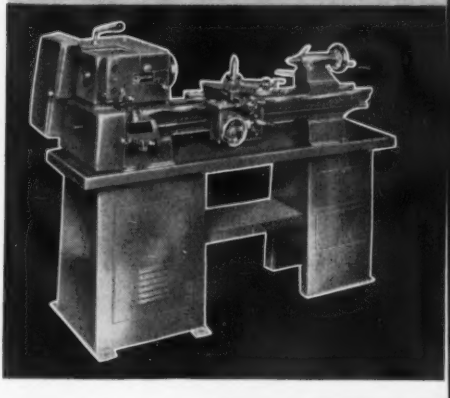
PLUS VALUE LINE

VERTICAL MILLER

Mills, Drills, Bores, Reams and Shapes at all angles with one work setup! Rigid, high precision spindle head with 7 ball bearings. Chrome nickel steel spindle. 6" x 24" table, 6 spindle speeds, 180 to 3250 RPM. No. 7 B&S or No. 2 M.T. spindle are optional.

NEW 12" LATHE

Featuring: "Zero-Precision" Timken tapered roller bearings • exclusive clutch and brake equipped countershaft • 1" collet capacity • 12" swing • 1⅜" hole • No. 3 M.T. tailstock • double-walled automatic apron • quick change mechanism • massive precision ground bed.



Write for FREE ILLUSTRATED LITERATURE

CLAUSING DIVISION, QUALITY MACHINE TOOLS SINCE 1911 *Atlas Press Company*

10-110 N. PITCHER ST., KALAMAZOO, MICHIGAN

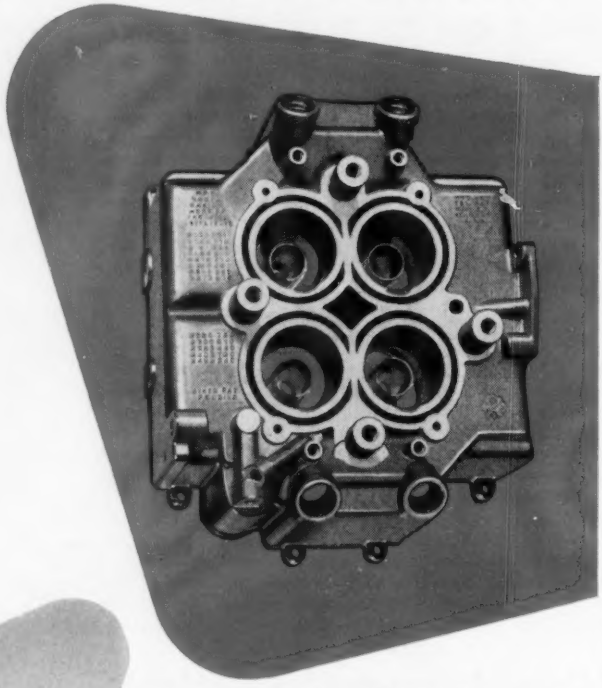
Atlas CLAUSING DIVISION ATLAS PRESS COMPANY KALAMAZOO, MICHIGAN U.S.A.

CLAUSING HEAVY-DUTY MACHINE TOOLS • ATLAS METALWORKING MACHINE TOOLS • ATLAS WOODWORKING POWER TOOLS

How would you do all these operations?

. . . fast, with utmost precision, at lowest cost

DRILL	2	HOLES
TAP	2	HOLES
DRILL	2	HOLES
REAM	2	HOLES
TAP	2	HOLES
FACE	4	SURFACES
CLEANOUT	4	DIAMETERS
FACE	4	SURFACES
TAP	2	HOLES
REAM	2	HOLES
DRILL	2	HOLES
TAP	2	HOLES
DRILL	2	HOLES



Ask your Morris representative for details on our deferred payment plan.

Here's the Morris Mor-Speed answer

. combining 32 operations, delivering up to 375 parts per hour!

Imagine the machines, and floor space required to do this part on a separate machine basis! Instead, there's just one machine, producing approximately six parts per minute!

Important too, there's no sky-high "special machine" price tag on this or any Morris MOR-SPEED. Standard machining units are grouped on a standard base, around a standard indexing table and provided with the necessary tooling. The result is high production at lowest cost.

Although your multiple drilling, tapping, reaming and similar operations may not be as complicated as this Morris installation, chances are Morris Engineers can show you proof of substantial savings. Investigate today.

Morris

THE MORRIS MACHINE TOOL COMPANY,
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IT'S UNIQUE...IT'S PROVEN...

Amazing New "Floating Action"

can save your shop a fortune!

IT'S OUR RISK...Not Yours!
read the Guarantee

Tapmatic is unconditionally guaranteed to — PRODUCE MORE THREADED HOLES...TO SPECIFIED TOLERANCES...PER DOLLAR SPENT—Or full refund — without question!

At last! Human error is drastically reduced in tapping operations!

NOTE THESE TAPMATIC TAP DRIVER EXCLUSIVE FEATURES:

1. FLOATING ACTION BALL DRIVE permits tap literally to "float" into hole and thread uniformly. Operator applies no axial pressure himself: *a thread cut "weightlessly" is an accurate thread.*

2. SPRING LOADED CLUTCH is adjustable to desired torque: Prevents Tap breakage in blind hole tapping... tap automatically stops when it becomes dull.

3. COMPACT DESIGN—gives operator better visibility... readily adaptable for multiple spindle operation.

We guarantee—*using inexperienced help* — you'll get consistent thread accuracy, longer tap life, lower labor cost, fewer "rejects"— on either ferrous or non-ferrous components.

Why wonder, why doubt? Send for COMPLETE LITERATURE TODAY!

TAPMATIC TAP DRIVERS

DISTRIBUTORS WANTED:
Write Eric S. Johnson, Sales Manager

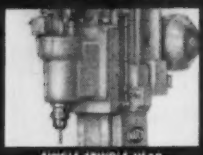
TAPMATIC CORPORATION
845 West 16th St., Costa Mesa, California

NEW FEED and CONTROL MECHANISM *increases production!*

D225H MACHINE

AVAILABLE WITH

- ✓ SINGLE SPINDLE HEAD
- ✓ ADJUSTABLE SPINDLE HEAD
- ✓ FIXED CENTER SPINDLE HEAD



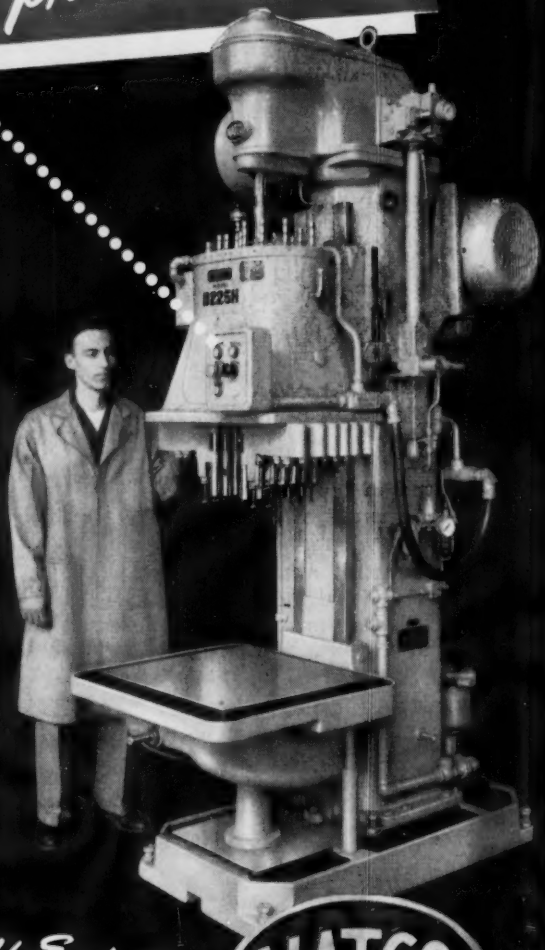
SINGLE SPINDLE HEAD

FIXED CENTER SPINDLE HEAD

...for medium size work new push button control reduces costs by speeding operations

POSSIBLE FEED CYCLES

1. STANDARD CYCLE—Rapid traverse forward, 1st or coarse feed forward, 2nd or fine feed forward, rapid reverse, stop.
2. JUMP FEED CYCLE—Additional Equipment. Rapid traverse forward, 1st or coarse feed forward, rapid traverse forward, 1st or coarse feed forward, 2nd or fine feed forward, rapid reverse, stop.
3. TIME DELAY REVERSE CYCLE—Additional Equipment. Rapid traverse forward, 1st or coarse feed forward, 2nd or fine feed forward, dwell against positive stop for predetermined time, rapid reverse, stop.



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to help you solve your problems in Drilling, Boring, Facing and Tapping

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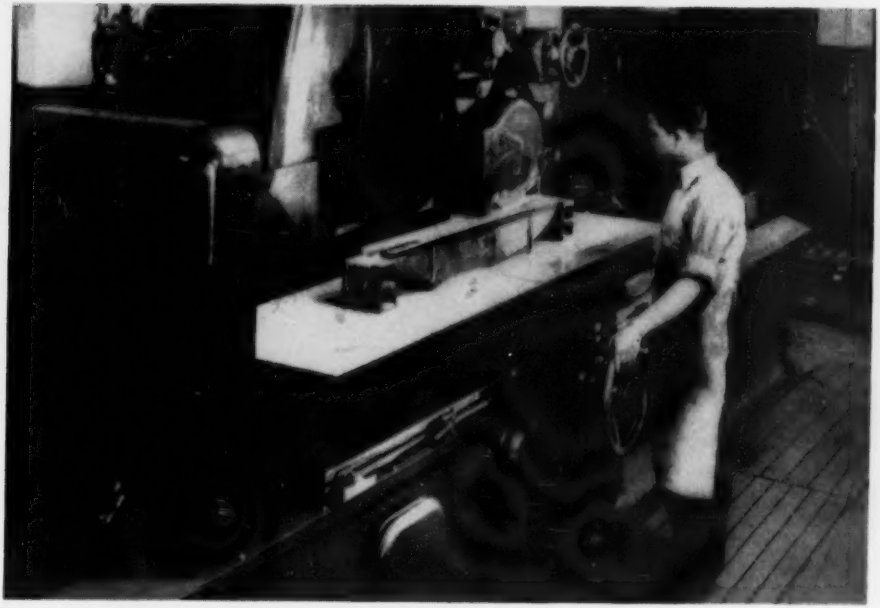
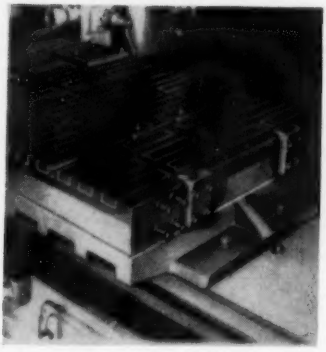


Making Standard Chucks Do Special Jobs



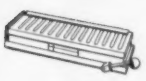
Tips from Taft-Peirce on Selecting Magnetic Chucks

Many times when a job requires an outsize magnetic chuck, an unusual shape, or a special setup . . . a combination of standard Superpower Chucks can be used to solve the problem. And at considerably lower cost. For instance, take the chuck on the machine above.

It's actually two standard 24" x 48" Superpower Chucks, placed end to end. This tandem arrangement provides a split in the middle, which operators find valuable for a reference point in setting up and machining work.

There are, of course, cases where standard chucks won't do. For example, the special 55½" x 40" Superpower Chuck, at left, was built to hold cast iron loomsides on a 75 HP milling machine — while three 18" carbide cutters and two 4" mills take ¼" cuts simultaneously at 30" per minute. Even a Superpower Chuck (which packs more power in less space) must be specially built to handle such a job.

Perhaps you've got a chucking problem. Since we make both standard and special chucks we're impartial. We'd be glad to advise you which is best for your job. Just drop us a line, and ask for your copy of the Taft-Peirce Handbook, too.



PERMANENT MAGNET CHUCKS

RECTANGULAR ELECTRO-MAGNETIC CHUCKS

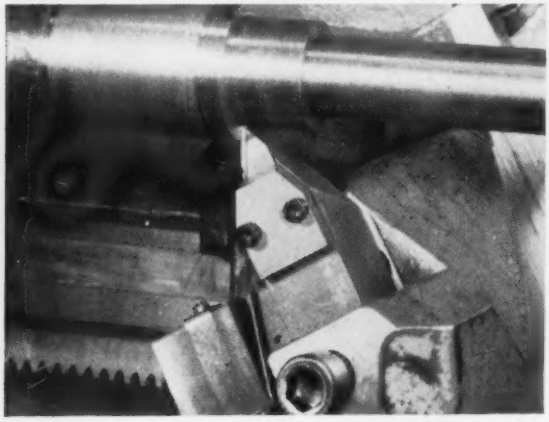
ADJUSTABLE ELECTRO-MAGNETIC CHUCKS

ROTARY ELECTRO-MAGNETIC CHUCKS

T-P means Top Precision

THE TAFT-PEIRCE MANUFACTURING COMPANY, WOONSOCKET, RHODE ISLAND

. . . a performance report on another Kennametal grade with ideas you can use to cut machining costs



New Kennametal profiling tool, with clamped K4H grade insert, machining pinion gear blank on New Britain + GF + Copying Lathe. The Lathe's hydraulic system operates the copying slide and actuates several automatic functions.

100% increase in surface speed on New Britain +GF+ Copying Lathe with new Kennametal* K4H Profiling Tool

A series of tests were run to determine which tooling would best utilize the performance potential of this New Britain +GF+ Copying Lathe in profiling SAE 8720 steel pinion gear blanks.

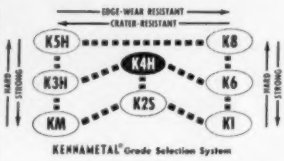
With K4H inserts clamped in new Kennametal PT Style Tools, these tough pinion forgings were profiled at 850 RPM. The machining time averaged 32 seconds, holding plus or minus 0.001 inch on all diameters. The depth of cut on each side was $\frac{3}{8}$ inch. An average of 220 pieces were machined per grind.

Prior to testing K4H inserts, the maximum lathe speed practical with standard brazed carbide tools was 425 RPM.

The 100 percent increase in surface speed made possible by the use of K4H inserts permitted fuller utilization of the capabilities of this new, versatile, high speed lathe. A20

*Registered Trademark

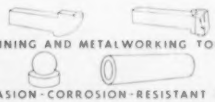
K4H is a hard grade with unusually high strength which makes it suitable for roughing scaly, abrasive steel castings and forgings where both edge-wear and crater resistance are required. Versatile K4H is also an excellent grade for interrupted cutting and, when used as a brazed tool, for a variety of finishing operations where the chip load is light.



KENNAMETAL® Grade Selection System

The easy-to-use grade selection guide shows that K4H is harder than K2S—more crater resistant than K6—more edge-wear resistant than K3H. It is an intermediate grade having a wide range of application. Where greater edge-wear or crater resistance is desired, performance can be improved simply by changing to the grade indicated on the guide.

Across the country, over 150 Kennametal Tool Engineers are helping plants solve their machining problems by analyzing tool wear—helping select the tool or grade best suited for the job—conducting in-plant training programs. You'll find Kennametal Offices listed in the classified sections of telephone directories in principal cities. Call your nearest Kennametal Tool Engineer, or write to KENNAMETAL INC., Latrobe, Pa.

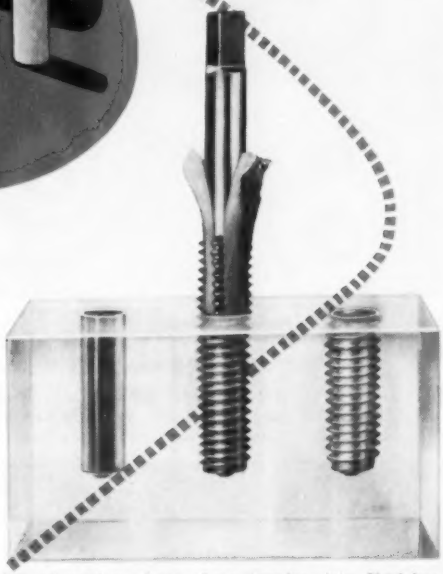

MINING AND METALWORKING TOOLS
ABRASION-CORROSION-RESISTANT PARTS
INDUSTRY AND
KENNAMETAL
. . . Partners in Progress

WOODWORKING TOOLS
WEAR AND HEAT-RESISTANT PARTS

Tap-Cartridges

PERMIT

tapping to very bottom of hole in one fast operation, insuring clean . . . uniform threads



The illustration above shows tapping into Plexiglass, allowing photography to show operation at various stages through the clear material.

CARTRIDGE TAPPING

Consists of tapping into and through an extrudable tap cartridge (containing Carnauba Wax and High Grade Mineral Oil) which has been inserted (manually or automatically) into the drilled hole.

- **Eliminates Chip Clean-Out.**
- **Increases Tap Life Up To 5 or 10 Times.**
- **Tap-Cartridges are availale in sizes from 0-80 Up and for any drill depth.**
- **Available in blank, coil or strip form.**

WRITE FOR DETAILS AND YOUR LOCAL DISTRIBUTOR

THE TAP-CARTRIDGE CO.

10167 SPRINGFIELD PIKE **CINCINNATI 15, OHIO**

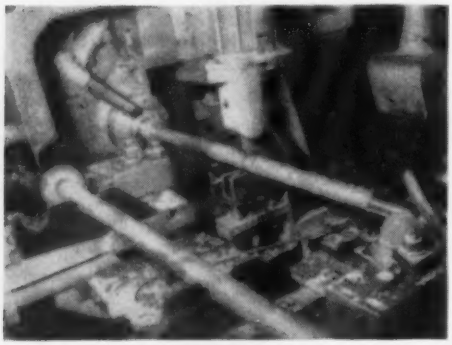
YOUR SOLUTION TO THE BLIND HOLE TAPPING PROBLEM . . .

From on-the-job reports

PRODUCTION INCREASES UP TO 30%

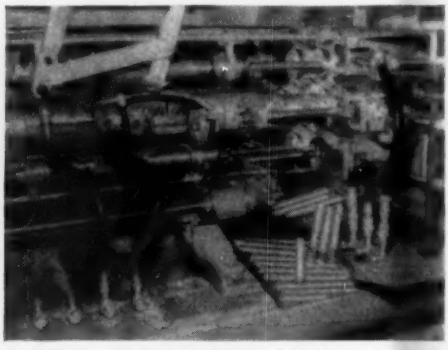
PROPELLER RUNNER. Grade 370 cut machining of tip contours on 165-ton runner from 220 to 65 hours. Carbide takes interrupted cuts through heavy scale at 3 times former speed, with 88% less downtime.

SETUP: Material—Welded high-tensile carbon steel (A 148-50 T, GR 80-50). **Speed**—154 SFPM. **Feed**—$\frac{1}{32}$ inch. **Depth of cut**—$\frac{7}{16}$ inch. **Coolant**—No.



TRUCK AXLE FORGING. Turning with Grade 350 resulted in 33% more pieces per tool. Chipping and flaking, encountered with previously used tools, were eliminated.

SETUP: Material—AISI 4150 steel forging. **Speed**—200 SFPM on 2-inch diameter; 400 SFPM on 4-inch diameter. **Feed**—0.014 inch. **Depth of cut**—$\frac{1}{16}$ to $\frac{1}{8}$ inch. **Coolant**—Yes.



THREADED LEVELING SCREWS. Carboloy Grade 370 tools, used in 6-spindle Cone Automatic, boosted production to 944 screws per hour, compared to 140 with steel tools.

SETUP: Material—SAE B1112 one-inch diameter steel screw stock. **Speed**—1586 RPM for threading. **Feed**—0.005 inch for chamfering and cutoff. **Coolant**—Yes.

WITH NEW CARBOLOY® SERIES 300 STEEL-CUTTING CARBIDES

Case histories prove Grades 350 and 370 outperform, outlast other carbides on tough steel-cutting jobs.

Carboloy Grades 350 and 370 are capable of cutting more cubic inches of steel per minute, with longer tool life, than any other carbides. This has been *proved* on in-the-plant applications, where these grades have boosted production as much as 30% over previous carbides used.

Grade 350 for medium-duty steel cutting, and Grade 370 for heavy-duty steel cutting, are of a new family of carbides, manufactured by an entirely new process.

Both grades have a built-in structural rigidity that enables them to operate at temperatures as high as 1800°F without the tip deformation found in other carbides. They combine superior wear resistance and extreme toughness to a degree never before possible.

Full stocks now available from Authorized Carboloy Distributors

Standard Carboloy Tools are available in Grades 350 and 370. In addition, blanks and inserts of each grade are available in a wide range of styles and sizes.

Carbides for *any* machining job. Regardless of your particular machining problem, a grade of Carboloy cemented carbide is available to handle it. Over a quarter century of experience in machining ferrous and nonferrous, metallic and nonmetallic materials has been acquired by the Carboloy organization. See your Authorized Carboloy Distributor or Carboloy salesman for qualified, expert machining assistance.

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

Carboloy
Department of General Electric Company
11143 East 8 Mile Ave., Detroit 32, Michigan

Send new Price List GT-300, containing specifications and prices on new Grades 350 and 370.

Name _____ Position _____

Company _____

Address _____

City _____ Zone _____ State _____

any way
you look
at it...
SIMONDS
ABRASIVE CO.
Plate Mounted Wheels
save money for
Carbide Tool Grinding
Less costly than diamond wheels! Especially efficient for roughing, semi-finishing and, frequently, finishing, too! Made to high standards of accuracy. Grind fast and cool. Made to fit all leading makes of grinders. Prompt delivery from stock. Write for bulletin ESA-181.
SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA.
BRANCH WAREHOUSES: BOSTON, DETROIT, CHICAGO, PORTLAND, SAN FRANCISCO • DISTRIBUTORS IN PRINCIPAL CITIES
DIVISION OF SIMONDS SAW AND STEEL CO., FITCHBURG, MASS. • OTHER SIMONDS COMPANIES: SIMONDS STEEL MILLS, LOCKPORT, N.Y.
SIMONDS CANADA SAW CO., LTD., MONTREAL, QUEBEC AND SIMONDS CANADA ABRASIVE CO., LTD., ARVIDA, QUEBEC

"MARVEL" HAS always had the edge

MARVEL High-Speed-Edge Blades assure Faster, more Accurate cutting with proven Economy and complete Safety. Only the MARVEL is a composite blade with a high speed steel cutting edge electrically welded to an exceptionally tough, strong alloy steel body.

The High-Speed-Edge does the cutting while the alloy back with hardened eyes, carries the load. Blade tensions up to 300% higher than those possible with ordinary blades are recommended. This greater tension is confined to the cutting or leading edge by the location of pin holes (exclusive MARVEL design feature) and cannot be overcome by work resistance. Heavier feeds and greater speeds are practical without "run out."

With greater accuracy, higher production and lower cost per cut, come the extra dividend of Safety, for MARVEL High-Speed-Edge Hack Saw Blades are Positively Unbreakable—*they will not shatter.*

Ask your local MARVEL distributor (see classified phone book) to help you modernize your metal sawing with MARVEL High-Speed-Edge Blades. They cost no more than ordinary high speed steel blades.

1. High Speed Steel cutting edge.

2. Tough unbreakable alloy steel body with hardened eyes.

1. & 2. Integrally welded to make a fast-cutting, long lasting composite blade that is positively unbreakable.

ARMSTRONG-BLUM MFG. COMPANY

"The Hack Saw People"

5700 BLOOMINGDALE AVENUE **CHICAGO 39, ILLINOIS**

MARVEL *Metal Cutting* SAWS

Better Machines - Better Blades

It's here...the NEW DUMORE® AUTO

The most complete unit for its size and capacity on the market today!

More ALL-STAR mass production features! More ALL-STAR cost reduction features! See how much this Dumore unit offers!

★Easy mounting in any position.

★Built-in controls for manual, semi-automatic and automatic operation.

★Positive, no-slip spindle drive with ten selective spindle speeds.

★Economical low-air-volume operation.

★Air and hydraulic systems completely separate—minimizes maintenance.

★Keeps tooling simple — tooling costs low.

★Individual unit control provided in multiple unit setups — for rapid tool changes or job conversions.

★When mounted on a standard drill press column, the unit becomes a self-contained, automatic drilling and tapping machine.

★Full 3″ stroke with depth adjustment to within ± .001″.

★Built-in auxiliary circuits for automatic activation of transfer equipment, indexing fixtures, other drill units for sequence operation in multiple setups.

PLUS THESE OPTIONAL ACCESSORIES:

★DUMORE REPEAT CYCLE TIMER — for *automatic stage drilling and tapping* of deep holes — providing automatic chip clearance, better holes, less drill and tap breakage.

★DUMORE HYDRAULIC CONTROL (optional) . . . for quick insertion or removal. Provides rapid approach, controlled feeds through work.

★A variety of mounting accessories is available for adapting to existing or specially designed equipment.

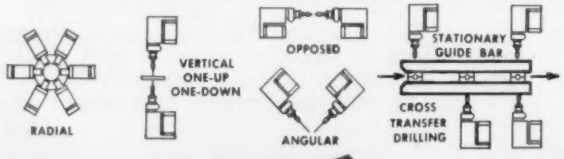
SPECIFICATIONS:

Dumore Automatic Drill Unit

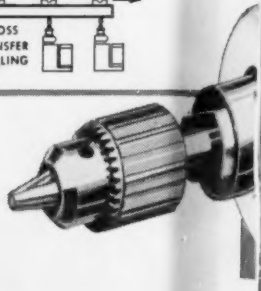
WIDTH: Approx. 9½″ • HEIGHT: approx. 15″ • LENGTH OVERALL: (Incl. chuck) 24″ • WEIGHT: (Incl. motor) approx. 88 lbs. • FEEDS: Adjustable from 25 to 400 lbs. thrust • RAPID APPROACH RATE: Adjustable up to 600-in. per min. (Distance adjustable from 0″ to full stroke.) • AVAILABLE MOTORS: ½ or ⅓ HP; constant speed, continuous duty.

Get all the details! Send for descriptive bulletin today!

Mount the Dumore Automatic Drill Units to fit your needs



DUMORE®
PRECISION TOOLS
RACINE, WIS.



sensational
MATIC DRILL UNIT

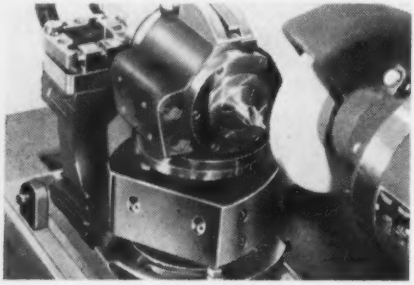
Advertisement

New Form Relieving Fixture Offers Extra Life for Cutting Tools

. . . SEE FRONT COVER

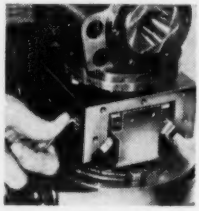
More cuts per grind made possible by new Royal Oak fixture which now permits grinding radial relief, axial relief or any combination of the two.

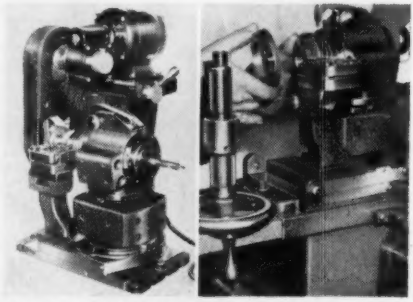
PERISHABLE tool life, up for serious study as a factor in mounting production costs, can be controlled to a large extent by proper grinding. Common procedure of relieving the cutting edge by grinding straight tapers behind it leaving it unsupported results in premature breakdown of the edge and short tool life. Development of the new Royal Oak fixture, in which the tool is moved into the wheel on a plane by interpretation of a cam, permits leaving maximum metal for support of the edge.



Carriage, with dovetail ways operating on 8 preloaded precision bearings, is turned to determine direction of tool movement and amount of axial and radial relief.

No rocking action is involved in the new design. Grinding radial or axial relief or any combination is made possible by an enclosed carriage assembly involving dovetail ways moving on anti friction bearings. Control is easily maintained in grinding taps, step drills, reamers, boring tools, center drills, end cutting form tools, etc. Cam interchange and adjustments for obtaining various degrees of axial and radial relief has been completely simplified. Use of the new fixture requires a minimum of skill. A catalog is available from the manufacturer, Royal Oak Tool & Machine Co., 29800 Stephenson Highway, Royal Oak, Michigan, who will also arrange for a demonstration in your plant.





Motorized fixture for volume work has stepless speed control. Cams may be substituted for tools of any number of flutes.

New SKIL 1/4" DRILL

55% more powerful... yet lighter in weight!

MODEL 75

Big portable drill news! A *new* SKIL heavy-duty drill ... 55% more powerful, yet actually *lighter!*

Here's your short cut to reduced time and labor costs ... to increased production output! Unequalled performance ... top operating power, longer life. Capacity: ¼" in steel, ½" in wood. Choice of 7 speeds, 500 to 5000 r.p.m. ... to meet your individual needs.

LOOK OVER THESE IMPORTANT FEATURES:

- All anti-friction bearings—for greater efficiency and low maintenance.
- Motor 55% more powerful, yet lighter than previous models.
- Contour-fit handle for easier, more comfortable handling.
- Larger inspection plates, easily removed for checking and cleaning.
- New molded rubber strain relief—protects cord against fraying or breakage at drill cord attachment joint.
- Handy, safety-designed trigger lock for continuous operation—side location for easy operation.
- Convenient chuck key holder on cord.

***FREE!* Convincing Demonstration and Trial Prove "SKIL is the answer" to Your Production Bottlenecks! Send Coupon Today!**

SKIL
PORTABLE TOOLS

Made only by SKIL Corporation, formerly SKILSAW, Inc.
5033 Elston Avenue, Chicago 30, Illinois
3601 Dundas Street West, Toronto 9, Ontario
Factory Branches in All Leading Cities

—MAIL THIS COUPON!—

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☐ I would like a demonstration and trial ... *FREE!*
☐ Please send me illustrated literature on the new SKIL ¼" Drill.

Name_____

Company_____

Street_____

City_____ Zone____ State_____

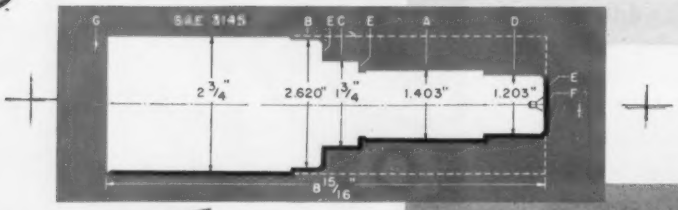
This is the difference High Velocity Turning makes

IN 1950 this job took...

12.40 min.

FLOOR TO FLOOR

A. Turn 489 RPM — .011 feed
B. Turn 340 RPM — .022 feed
C. Turn 489 RPM — .011 feed
D. Turn 489 RPM — .011 feed
E. Face end, shoulders & neck 489 RPM — .0055 feed
Chamfer
F. Center drill
G. Cut off 82 RPM — .0035 feed H.S.S.



IN 1954 this same job takes...

5.40 min.

FLOOR TO FLOOR

A. Turn 694 RPM — .022 feed
B. Turn 694 RPM — .022 feed
C. Turn 694 RPM — .022 feed
D. Turn 694 RPM — .022 feed
E. Face end, shoulders and neck — 694 RPM — .055 feed
Chamfer
F. Center drill
G. Cut off 489 RPM — .0025 feed

J & L TURRET LATHES GIVE...

MORE Ease of Operation
MORE Power Transmission
MORE Rigidity
MORE Accurate Stops
MORE Efficient Lubrication
MORE Coolant on Cutting Tools
MORE Accurate Results

Visitors who attend J &L's periodic "Production Studies" Seminars see this job turned out in just 5.40 min. on a Jones & Lamson #7A Universal Turret Lathe.

Only with lathes like this, built with plenty of power and the beef to back it up, can your shop take full advantage of the quality, productivity and lower costs offered by High Velocity Turning.

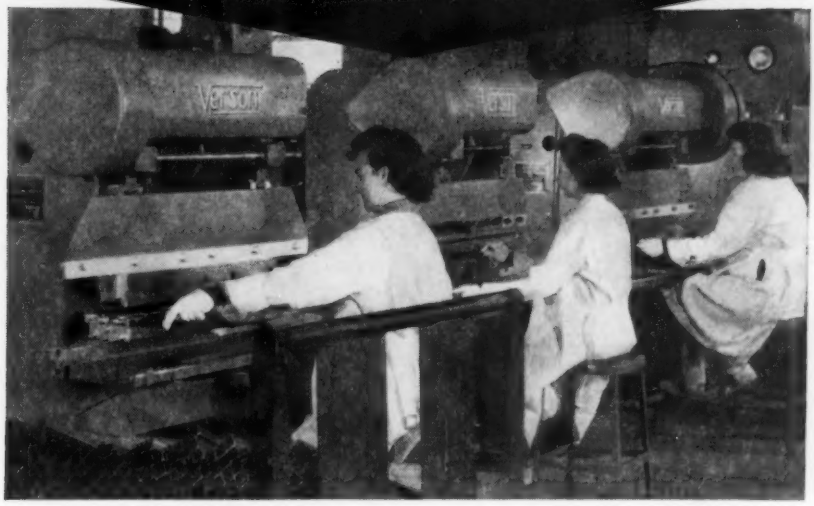
This job is one of the many turned at high speeds on our production line. Come to Springfield and see for yourself. At any rate, send for catalogs #101-A and #102.

JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 521 Clinton St., Dept. 710, Springfield, Vt., U.S.A. J&L MACHINE TOOL DIV.

Now you can buy a press brake like this "off the shelf" for $1455



Verson now offers standard brakes with immediate delivery from stock

Any shop where metal is bent can now take advantage of a new convenient way of buying quality all steel press brakes. There's no need for involved proposals or a long wait for delivery. You can now buy Verson No. 16-48 and No. 1062 brakes as easily as buying a car. Prices are published publicly and delivery of standard models is made from *stock*.

Write for spec sheets on either model and then place your order.

A Verson Press for every job from 60 tons up.

Verson

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

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So. Lamar at Ledbetter Drive, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES
TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

Now—Lock Your Feed Rates to Protect Machines . . . Reduce Costs with the CROSS Flow Control Lock!

Only authorized personnel carry a key for the Cross Flow Control Lock! They set machine feed rate, then lock it.

Easy to install. Just remove valve nameplate and adjusting lever, re-install over lock mounting plate.

Available for Vickers 1/4" flow control valves and remote control panels.

For full details, write Dept. A-610.

- **Eliminates Tampering**
- **Stops Costly Shutdowns**
- **Prevents Tool Abuse and Breakage**
- **Protects Machines Against Overloads**
- **Reduces Maintenance Costs**

Established 1898

THE **CROSS** CO.

DETROIT 7, MICHIGAN

an ACCO product

Wilson "Rockwell"* Hardness Testers

NOW...

you can own the **BEST** for only

$550

(less accessories, F.O.B. Bridgeport)

3-JR MODEL

6 Features for Tool Room and Production Testing

● This Model 3-JR WILSON "ROCKWELL" Hardness Tester is proving invaluable for tool room use and most production testing. It will pay for itself many times over by eliminating costly complaints from your customers.

These features make for accuracy and long life—

(1) Totally enclosed dirt and dust-proof "Zero-minder" dial gauge. (2) Gripsel clamp screw for quick change and proper seating of penetrator. (3) All controls conveniently grouped. (4) Enclosed, easy-to-reach, variable speed dash pot. (5) Stainless steel elevating screw. (6) Standardized weights.

No matter what your hardness testing requirements, there is a WILSON "ROCKWELL" Tester to meet it. They are in two types—Regular and Superficial. They are in many styles with accessories for testing flats, rods, rounds and odd shapes. Ask about the WILSON TUKON for micro-indentation testing. Write us for complete information and recommendations.

*Trade Mark Registered

ACCO

TRADE MARK

Wilson Mechanical Instrument Division

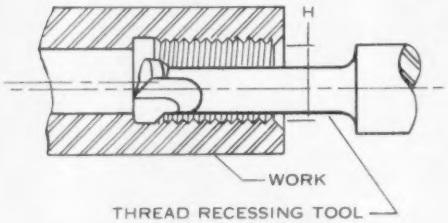
AMERICAN CHAIN & CABLE

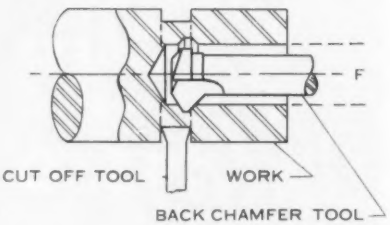
plus BRALES and TUKON

230-G Park Avenue, New York 17, N. Y.

Now FINISHED RECESSING TOOLS FROM STOCK

Instead of having the required tool made on a custom-made basis, it comes to you as one of a standard line production, thereby satisfies immediate needs and brings added economies to your tool purchases and tool operations. Both types of recessing tools available in H.S. Steel and Carbide-tipped.





THREAD-RECESSING TOOLS

To obtain perfect threads in blind holes, you can now purchase from stock, Standard Bokum Thread-recessing tools for most thread sizes.

These tools allow run-over with your threading tool or tap, insuring perfect threads to the full depth of hole and produce perfect fit for threaded stud.

BACK-CHAMFERING TOOLS

It is always desirable to back-chamfer a finished bore before cutting-off tool goes into action, to assure a cleaner, easier cut-off without throwing up burr.

The shank diameters and lengths of these new tools conform to standard sizes of screw machine tool holders.

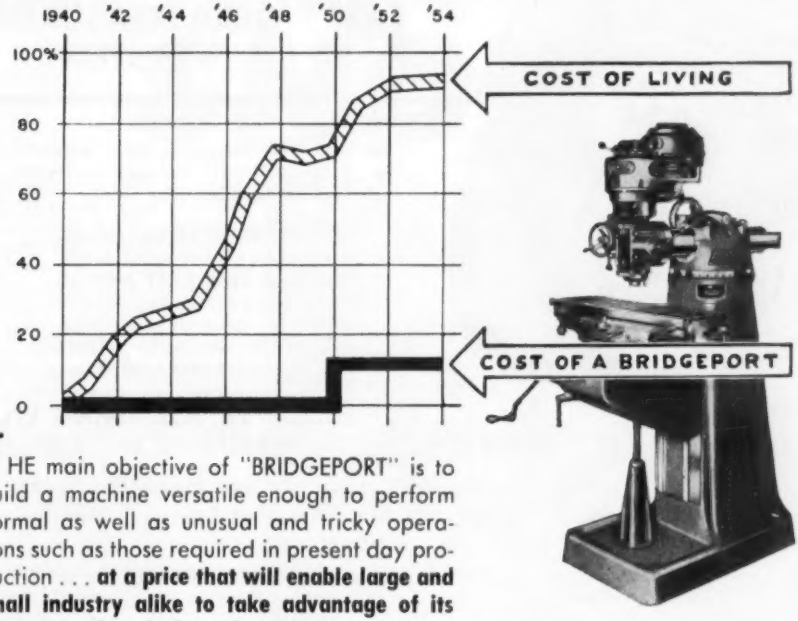
The tools are radial and helical backed-off, with built-in clearances following the same design that typifies all Bokum tools. Buy them in assortments of 12 put up in convenient wooden boxes.

For thread-recessing, send for Cat. Sheet B-TR; for back-chamfering, Cat. Sheet BB-CH.

BOKUM TOOL CO.

14775 Wildemere Ave., Detroit 38, Mich.

Holding the Price Line!



THE main objective of "BRIDGEPORT" is to build a machine versatile enough to perform normal as well as unusual and tricky operations such as those required in present day production . . . **at a price that will enable large and small industry alike to take advantage of its inherent and exclusive advantages.**

With quality and accuracy a prime consideration and never sacrificed to achieve a low selling price, we believe you will be interested in what has been made possible through modern tooling and machinery plus a cooperative supervisory and labor force in holding the price line of "Bridgeport Millers" over the past 16 years. The chart reproduced here tells the story far better than words.

IF prices of various commodities in every day use had increased no more than the price of the "BRIDGEPORT" . . .

you could buy the following today...

...at these prices...instead of these

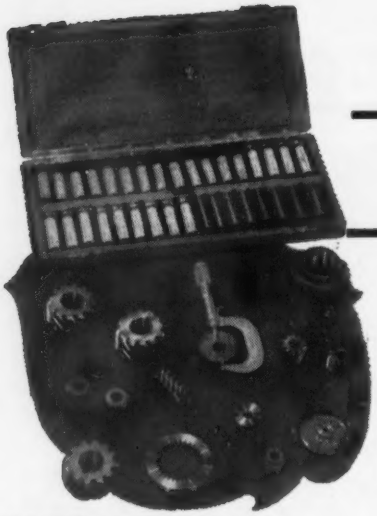
Housing	$ 7,850	.....	$18,000
Automobile	913	.....	2,046
Food	727	.....	1,500
Apparel	280	.....	500
Fuel, Electricity	224	.....	300

Ask your dealer . . . or us . . . to show you how by "holding the price line", shops both large and small have been able to modernize their production through the more than 20,000 "BRIDGEPORTS" shipped in the past 16 years.

Bridgeport **MACHINES, INC.**

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines



THE Van Keuren GEAR MEASURING SYSTEM

Set 26EX-Gear Measuring Wires, accurate to ±.000025", for common diametral pitch external spur gears.

VAN KEUREN GEAR MEASURING WIRES PROVIDE THE MOST ACCURATE AND LOW COST METHOD OF MEASURING THE TOOTH THICKNESS OF SPUR AND HELICAL GEARS, INVOLUTE SPLINES AND INVOLUTE SERRATIONS . . .

ONLY . . . EQUIPMENT NEEDED:

1—SET VK MEASURING WIRES
1—MEASURING INSTRUMENT

Complete information regarding the use of Gear Measuring Wires is contained in a 50-page section of the Van Keuren CATALOG and HANDBOOK No. 35. Included in this section are:

- . . . table of wire sizes for the 1.92", 1.728", 1.68" and 1.44" series.
- . . . tables of wire measurement including change factors for standard external and internal spur gears of 14½°, 17½°, 20°, 25°, and 30° pressure angles and of from 5 to 500 teeth.
- . . . table of relationships between depth of cut and tooth thickness for common pressure angle gears.
- . . . definitions and exact formulas covering involute spur gears.
- . . . tables of involute tooth parts for standard addendum and stub tooth involute gears.
- . . . information, formulas and examples regarding the wire measurement of helical gears.
- . . . information and examples concerning the wire measurement of enlarged pinions and reduced gears.
- . . . tables of wire measurement for involute splines.
- . . . tables of wire measurement for involute serrations.
- . . . tables of comparative measurement over three sizes of wires for use in involute profile checking.

CATALOG and HANDBOOK No. 35 is available without charge by writing to: The Van Keuren Co., 175 Waltham St., Watertown, Mass. Ask for your copy.

VK
35th YEAR

THE Van Keuren CO.,

175 WALTHAM STREET, WATERTOWN, MASS.

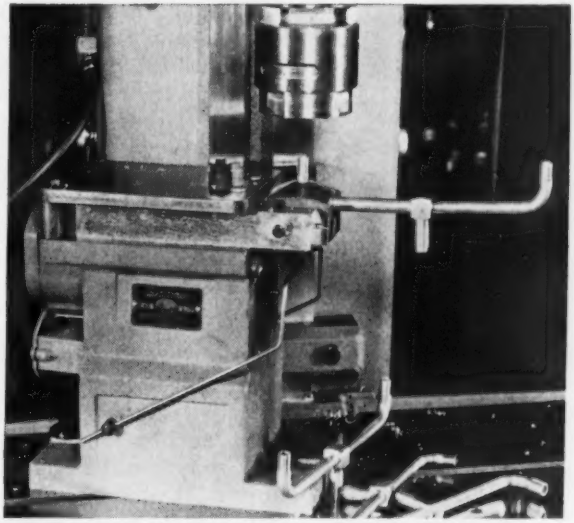
Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carboloy Cemented Carbide Plug Gages • Carboloy Cemented Carbide Measuring Wires • Chrome Carbide Taper Insert Plug Gages

Quicker changeover, lower tooling costs...

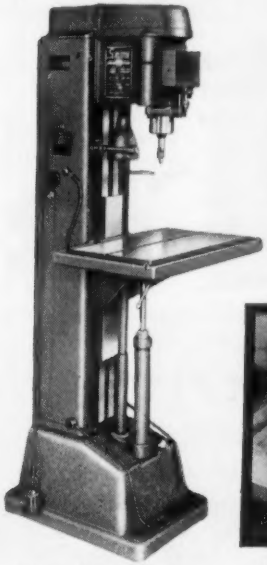
with SNOW FULL UNIVERSAL MACHINES

Basic Master Fixtures for DRILLING, THREADING or TAPPING. Snow universal machines are the most flexible, most efficient, and most economical known. They save countless dollars in changeover time — help you start jobs sooner — assure quality at high production rates.

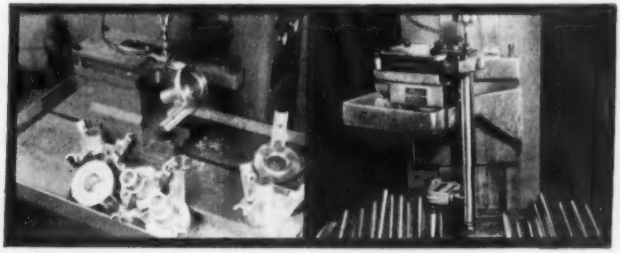
The square footage under a Snow Machine in your factory can be the most profitable in your whole plant. Submit details of your requirements.



AIR VISE holds part firmly — self-centering — always in exact position for precision work. U-shaped wire underneath provides quick finger-tip control, automatically starting spindle cycle. Jaw inserts keep tooling costs at minimum. Blank jaws always in stock — can be tooled to fit your part promptly, inexpensively.



ELECTRICALLY OPERATED AIR CONTROLLED AUTOMATIC OR SEMI-AUTOMATIC



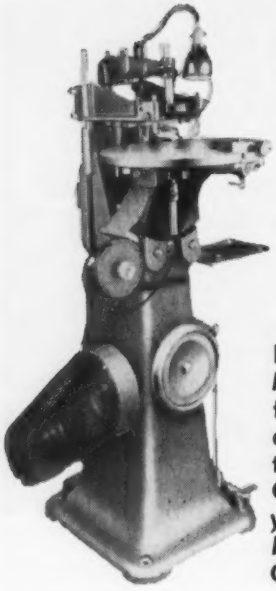
Irregularly shaped parts are easily handled. Front feed permits close setting of guide plate for greater accuracy with high production.

Here a short AIR VISE mounted on an offset table holds long tubing. Piece-part switch under table automatically closes vise and starts tapping operation.

SNOW MANUFACTURING CO., BELLWOOD, ILL.
(Suburb of Chicago)

You, Like Thousands of Others, Can Cut Die Making Costs

with OLIVER DIE MAKING MACHINES



Dependable and proved are OLIVER Die Makers. They reduce costs as much as 60% because they simplify sawing, filing and lapping operations. The Oliver Method saves time and does not require expensive, hard-to-get skilled labor. These efficient, speedy and accurate machines have proved themselves in more than 10,000 installations throughout the world. In many plants these durable OLIVERS have been in constant use for over 25 years.

For nearly 40 years OLIVER DIE MAKING MACHINES have been found invaluable on such jobs as Production Filing, Experimental Work, Metal Patterns, Cams, Gages, Templates, etc. Improve *your* toolroom efficiency . . . For *better* dies—saw and file with OLIVER DIE MAKING MACHINES.

OLIVER DIE MAKERS *Available in 5 Models*

The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

***Write Today For Complete Technical Data on* OLIVER DIE MAKERS**
See our catalog in Sweet's Directory

MACHINE TOOLS by OLIVER include:
AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES

OLIVER INSTRUMENT CO.

1430 E. MAUMEE • ADRIAN, MICHIGAN

"ELL"-OH!!

Prices start as low as $1575.00

•

(Motor and all Electrical Equipment included)

Eliminate cumbersome expensive threading and fabrication of pipe assemblies with "ELLS". It is now possible to bend 1" pipe and have only 1" of tangent on one end. The ell shown is 1" pipe, bent to a 2½" radius. Production machines with automatic duplicate bending relays are available up to and including 6" extra heavy pipe. The machine shown is the model "A-6" which has a bending capacity of 2" extra heavy pipe. Smaller and larger machines are available. The same machine can be used for bending tubes, structural shapes, reinforcing bars, etc., by merely changing the die.

Write for Descriptive Folder. Dept. 5.

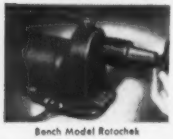
PEDRICK TOOL & MACHINE CO.

3640 N. LAWRENCE ST., PHILADELPHIA 40, PA., U.S.A.

World's Fastest Method of Gaging Threads

Taft-Peirce Rotochek Gages Threads 3 Times Faster

Flexible Shaft Model Rotochek

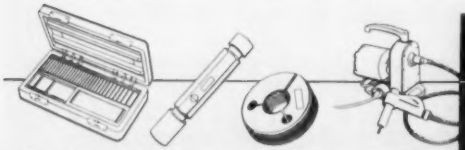


Bench Model Rotochek

You can triple your thread inspection rate with this simple, inexpensive device. A Rotochek is fast . . . accurate . . . easy to use. Operators report from 3 to 4 times as many parts inspected daily.

Simply push-pull and the part is inspected. Bring the part to the Rotochek, or the Rotochek to the part—a slight push and gage screws into the work. Release the pressure and the gage stops. Pull—and it disengages.

Available in bench model, or with gaging head on flexible shaft. Adaptors permit use of reversible thread members and ring gages. Send for bulletin with full description and prices.

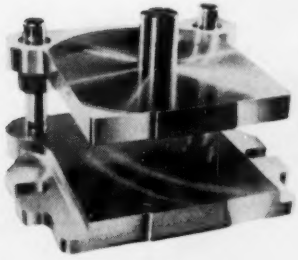


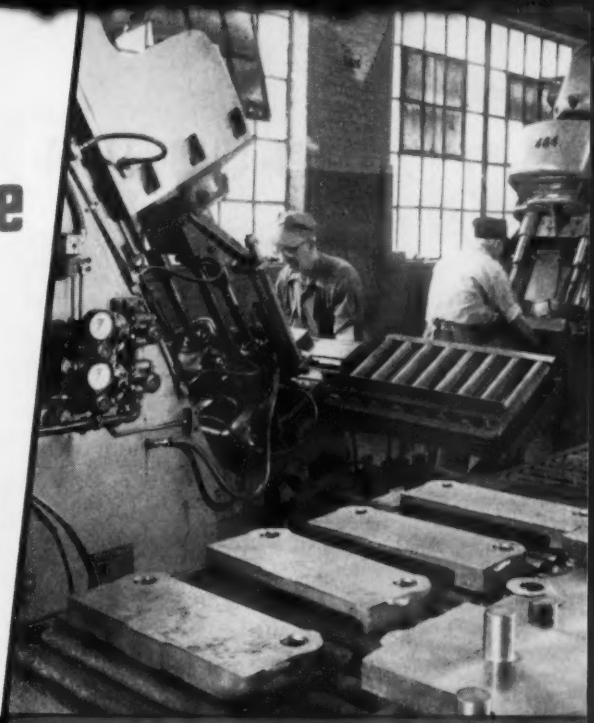
Gage Blocks Plain Gages Thread Gages Rotochek

T-P means Top Precision

THE TAFT-PEIRCE MANUFACTURING COMPANY, WOONSOCKET, R. I.

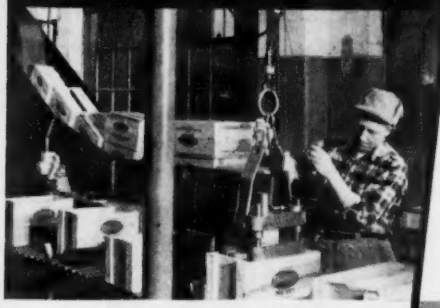
Fastest die set service ever





At the main Danly plant . . . high speed precision drilling. Interchangeable fixtures accommodate the full range of standard die set sizes.

. . . made possible by Danly's unique mass-production and distribution system.



At your Danly Branch plant . . . shipping die sets to your order. Up-to-date procedures and facilities assure fastest delivery.

To make your tooling program move faster, Danly mass produces interchangeable, precision die set parts . . . stocks them at your local Danly Branch ready for quick assembly to your order and delivery to you. With Danly, from the time you place your order until the set is delivered to you is a matter of only a few days. This extra fast delivery starts at the main Danly plant in Chicago where two complete high-speed production lines turn out a wide variety of precision die set parts. Held in ample stock by your local Danly Branch, these interchangeable parts are assembled to your order and delivered immediately. Don't let lagging die set delivery bog down *your* tooling program. Order from your Danly Branch and get the fastest service . . . ever.

DANLY

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue
Chicago 50, Illinois

Fast, nationwide delivery from these branch plants

*CHICAGO 50	2100 South Laramie Avenue
*CLEVELAND 14	1550 East 33rd Street
*DAYTON 7	3195 Delphos Avenue
*DETROIT 16	1549 Temple Avenue
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HEAVY LOAD/LIGHT WORK

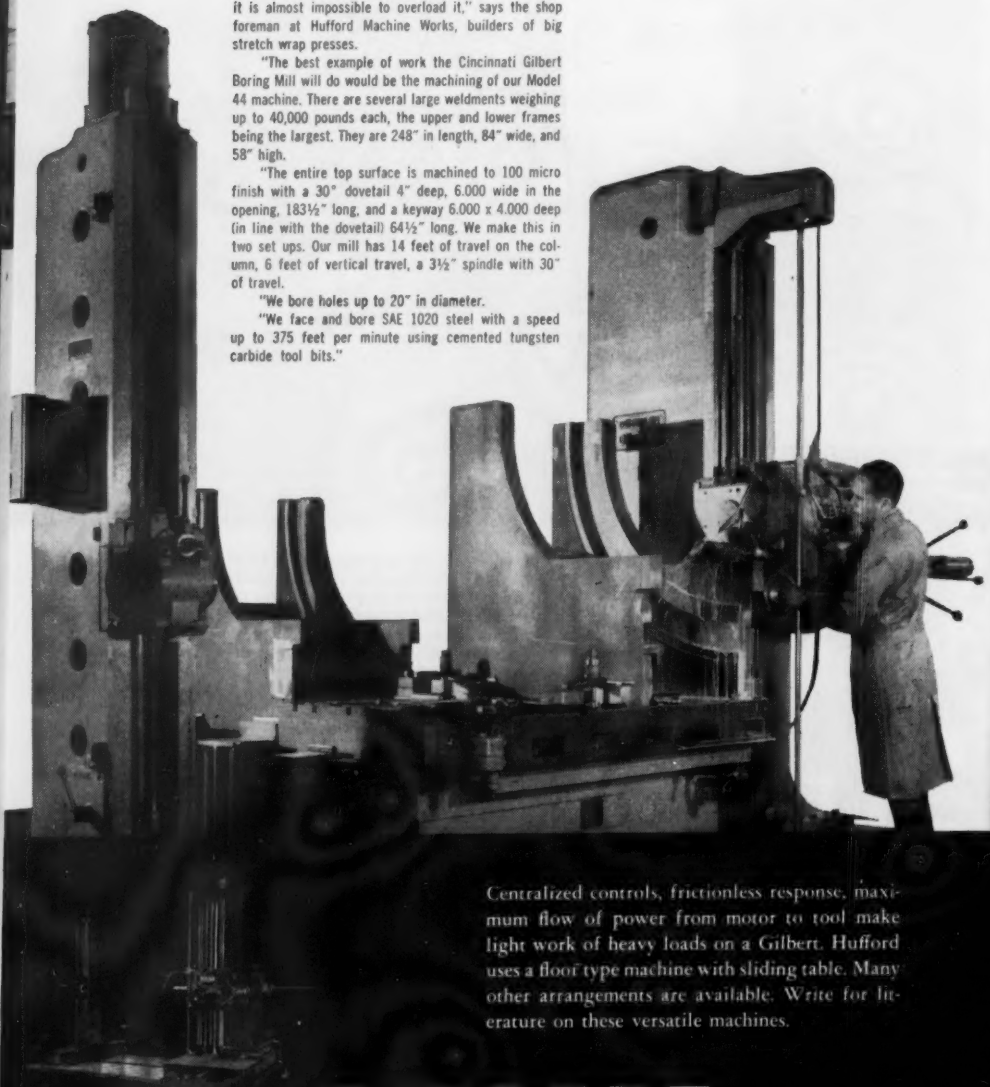
"The thing I like about the Cincinnati Gilbert is that it is almost impossible to overload it," says the shop foreman at Hufford Machine Works, builders of big stretch wrap presses.

"The best example of work the Cincinnati Gilbert Boring Mill will do would be the machining of our Model 44 machine. There are several large weldments weighing up to 40,000 pounds each, the upper and lower frames being the largest. They are 248" in length, 84" wide, and 58" high.

"The entire top surface is machined to 100 micro finish with a 30° dovetail 4" deep, 6.000 wide in the opening, 183½" long, and a keyway 6.000 x 4.000 deep (in line with the dovetail) 64½" long. We make this in two set ups. Our mill has 14 feet of travel on the column, 6 feet of vertical travel, a 3½" spindle with 30" of travel.

"We bore holes up to 20" in diameter.

"We face and bore SAE 1020 steel with a speed up to 375 feet per minute using cemented tungsten carbide tool bits."



Centralized controls, frictionless response, maximum flow of power from motor to tool make light work of heavy loads on a Gilbert. Hufford uses a floor type machine with sliding table. Many other arrangements are available. Write for literature on these versatile machines.

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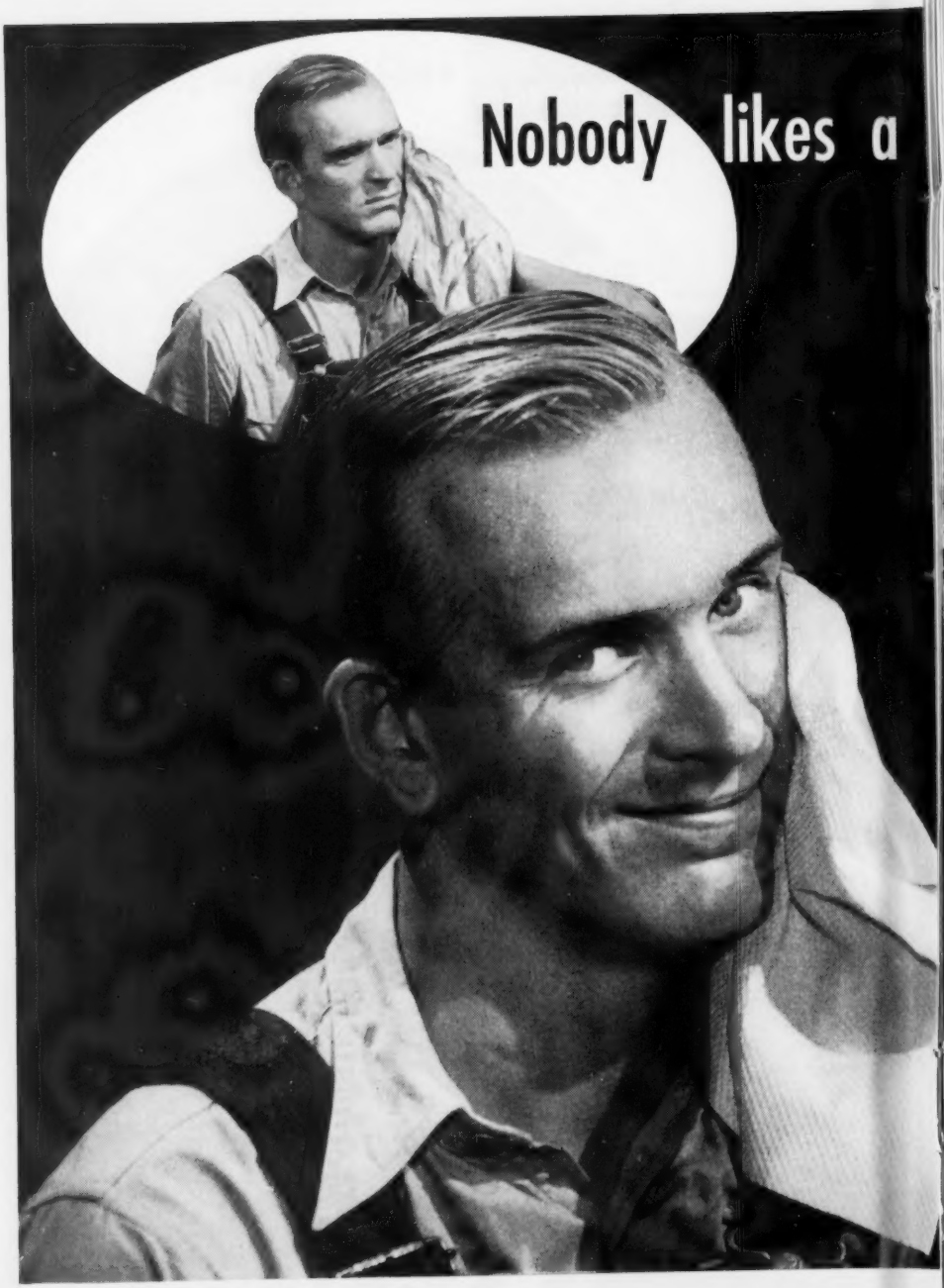
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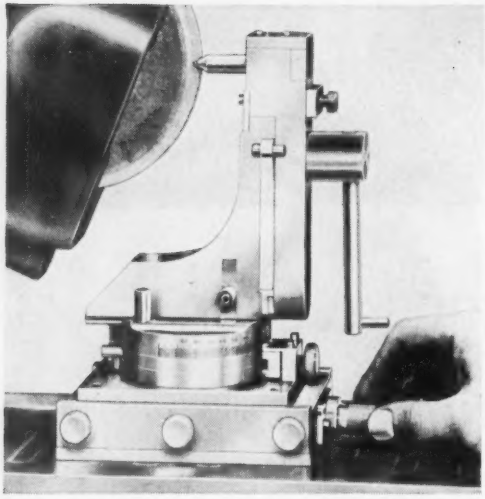
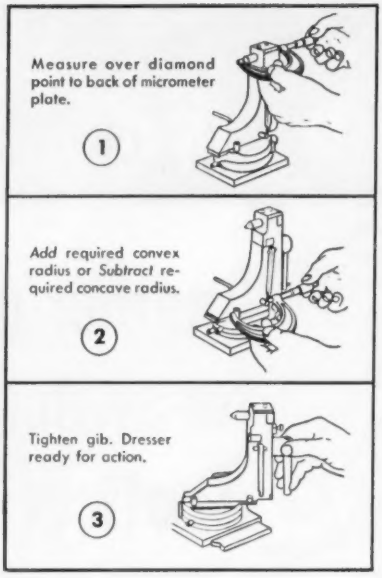


YOU CAN DRESS WHEELS UP TO 24" IN DIAMETER WITH J & S "FLUIDMOTION" WHEEL DRESSERS. MODEL REC SHOWN HERE.


Measure over diamond point to back of micrometer plate.
1
Add required convex radius or Subtract required concave radius.
2
Tighten gib. Dresser ready for action.
3

How to set angles in seconds, radii in minutes—save hours

These easy instructions show you how you can with a J & S "Fluidmotion" Wheel Dresser

Dressing wheels with a J & S "Fluidmotion" Wheel Dresser is easier than you might think. All you need is a micrometer and simple hex wrench. With a little practice, you can set 2 angles in about 10 seconds, a radius in just 2-3 minutes. Here's how to go about it:

To Obtain One Angle

Adjust center line of grinding wheel to height of diamond. The swivel base of the dresser is graduated at 100° on each side of center. Loosen knurled knob and hold both pins which protrude from bottom rings. Then simply set desired angle, tighten the knurled knob, and you're ready for action.

To Obtain Two Angles

Loosen knurled knob and set the pin on the *bottom ring first* for one angle. Then move pin on the middle ring for the other angle. Tighten the knurled knob—that's all there is to it.

To Obtain a Convex Radius on Grinding Wheel

Measure master reading over diamond point to back of micrometer plate (drawing #1) . . . for example	2.531"
Add required convex radius (drawing #2)	+ .069"
Setting for micrometer pins	2.600"

To Obtain a Concave Radius on Grinding Wheel

Measure over diamond point to back of micrometer plate (drawing #1) . . . for example	2.900"
Subtract required concave radius (drawing #2)	−2.142"
Setting for micrometer pins	.758"

Tighten gib. Dresser now ready for action (drawing #3)

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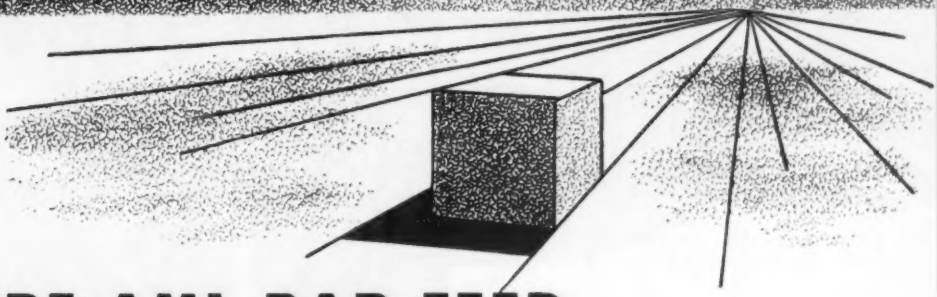

LIPE AML BAR FEED

gears machine production to the steady flow of Time

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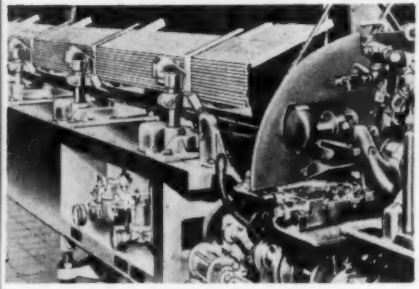

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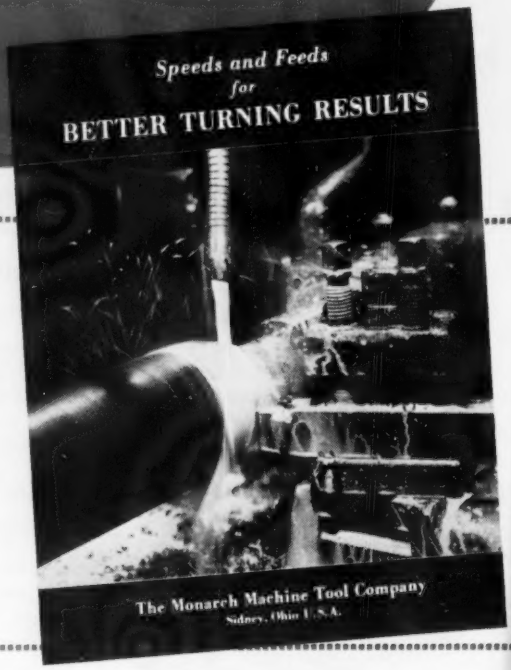

PARTIAL LIST OF CONTENTS

Subjects—Tool Angles; Machinability Ratings; Speed and Feed Charts; General Practice; Coolant; Horsepower.

Materials—These subjects are discussed as pertinent to: Plain and Carbon Alloy Steels; Tool Steels; Stainless Steels; Heat Resistant Alloys; Cast Iron; Nickel Alloys; Copper Alloys; Aluminum Alloys; Magnesium Alloys; Plastics.

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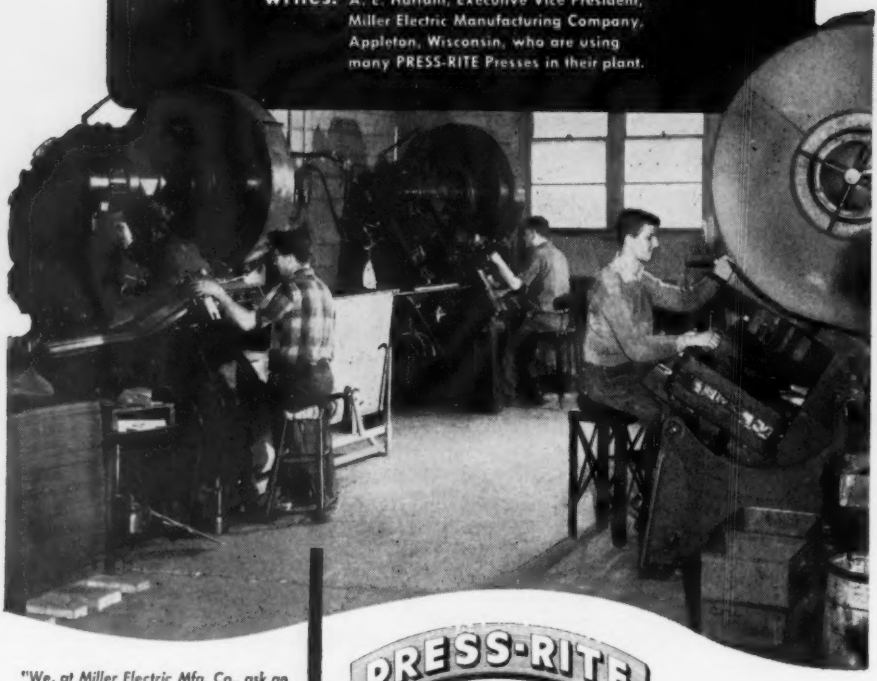

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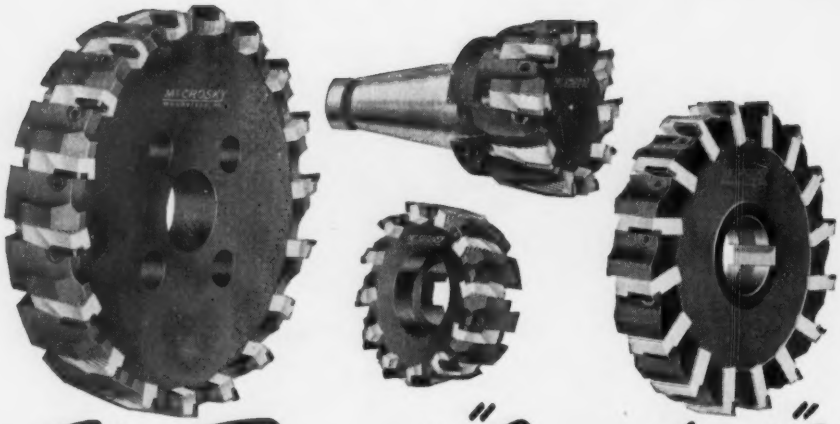

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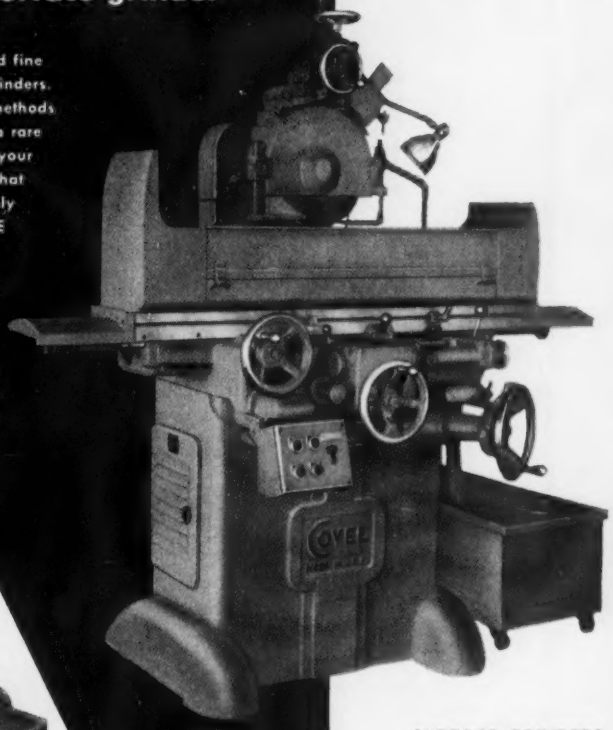

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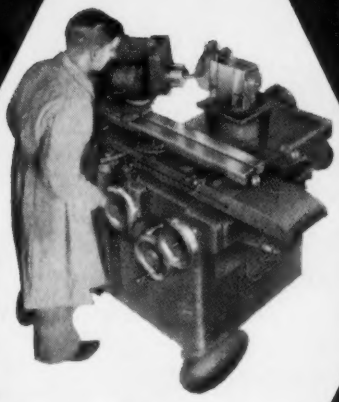

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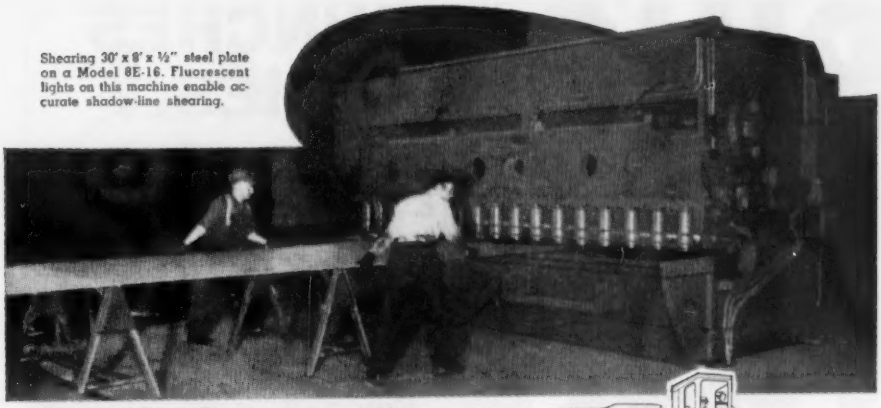
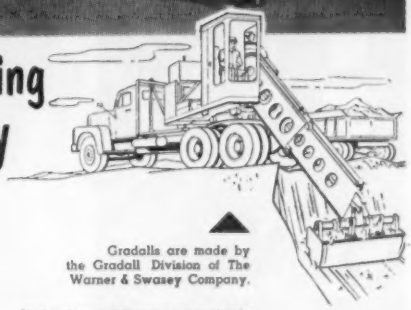


Shearing 30' x 8' x ½" steel plate on a Model 8E-16. Fluorescent lights on this machine enable accurate shadow-line shearing.

Smooth, Accurate Shearing Aids Warner & Swasey Gradall Production



Gradalls are made by the Gradall Division of The Warner & Swasey Company.

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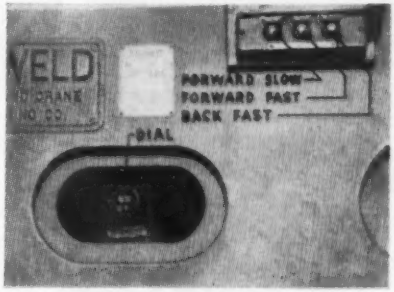
Dial and control buttons conveniently located at middle front of shear for setting motor-driven back gauge.



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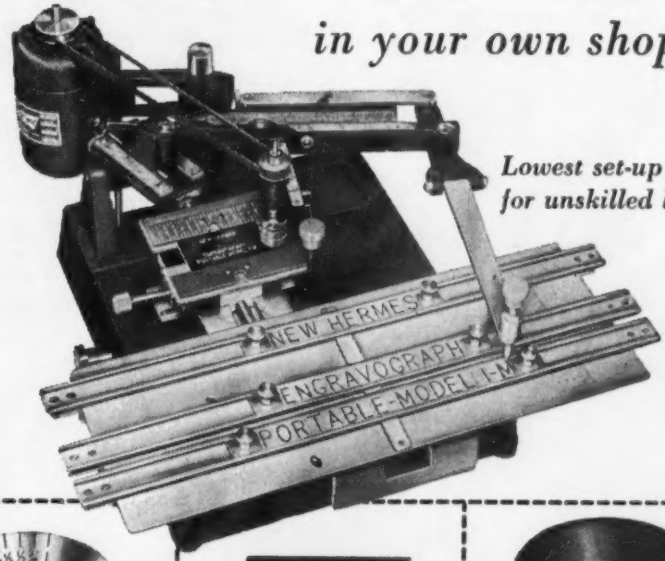

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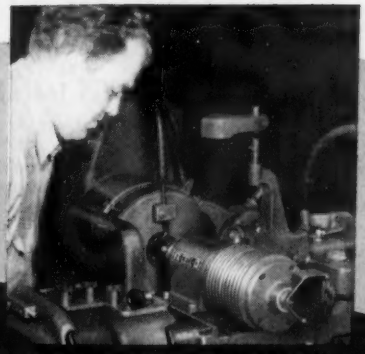

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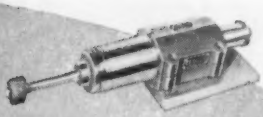
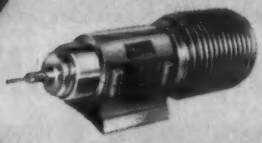


Single-body, belt-driven internal grinding spindle.

Double-body, belt-driven internal grinding spindle.

25 hp heavy duty precision spindle with 24" grinding wheel.



25,000 rpm high frequency inbuilt motor spindle.

Totally enclosed inbuilt motor surface grinder spindle.

Precision inbuilt motor spindle for cutter grinder.

Heavy duty motorized precision spindle available up to 20 hp

GET THE MOST FROM GRINDING OPERATIONS BY USING EX-CELL-O SPINDLES MADE FOR THE JOB

Ex-Cell-O Precision Spindles are the original equipment choice of leading grinder manufacturers. They are rigid, smooth-running. For high precision work they are fitted with standard Ex-Cell-O Precision Ball Bearings; for slower speeds and heavier cuts they are equipped with heavy-duty Ex-Cell-O Precision Ball Bearings. Phone your Ex-Cell-O representative or write to Ex-Cell-O in Detroit for grinding spindle catalog.

5412

XLO

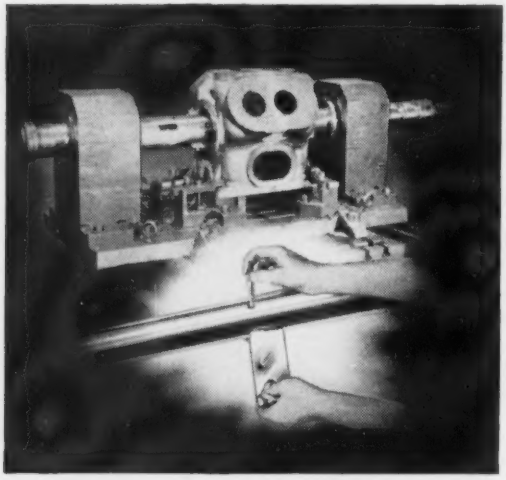
EX-CELL-O

CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

ROUTINE BORING: If there's a better way to do it, DAVIS will know it!



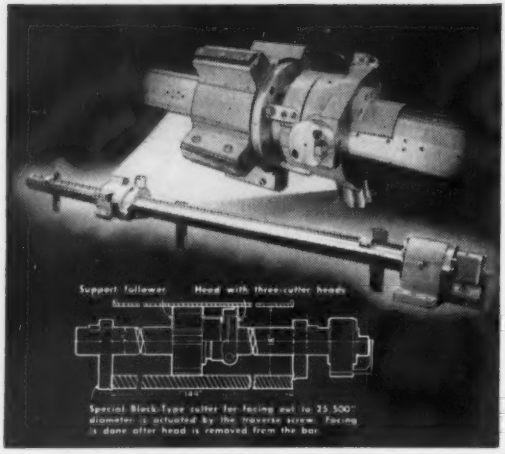
Here's how DAVIS tools help improve everyday jobs

Davis Block-Type cutters simplify ordinary float boring and reaming. Here, you see Davis Block-Type cutter, mounted in a Davis line bar, being used to bore the crank bores in an air conditioning housing.

Davis Block-Type cutters are exceptionally easy to insert or remove from the bar. Mere insertion or removal of the pin does the job. Without changing bar or setup, cutters can be changed for a sequence of operations.

When you reduce the time required for jobs performed every day, it adds up to important savings over a year's time. It's tooling aids like this that have proved the word, "If theres a better way to do it, DAVIS will know it."

EXTRAORDINARY BORING: If DAVIS can't bore it, it can't be done!


Support follower
Head with three-cutter heads
Special Block-Type cutter for facing out to 25.500" diameter, is actuated by the traverse screw. Facing is done after head is removed from the bar.

Traveling and feedout boring heads and blocks

Here's a special Davis three-cutter traveling boring head used to bore, face and chamfer. Mounted on a bar in a lathe, it is fed through the work by means of a traverse screw connected to the head. The support follower head, which assures a straight bored hole, slides through the bore while the bar rotates on needle bearings. Cross slide blocks face the two ends of the workpiece . . . are also used to cut phonographic grooves at the end.

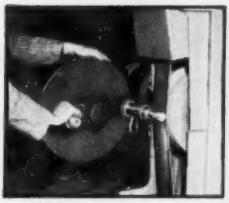
The lathe spindle drives the bar, and work is supported in a special fixture. Gear box provides feed and rapid traverse in inches per revolution. Feed rates can be varied by changing gears.

What's your boring problem?

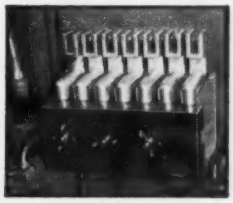
Davis makes a complete line of interchangeable block-type cutters, boring heads, boring bars, super-micrometer fly-cutter tools, L-type micrometer boring tools, special boring tools and accessories. Offers you a complete tooling service to solve any routine or extraordinary boring problems. Get the facts now. Write for the new Davis Catalog 304.

DAVIS
BORING TOOL DIVISION
of Giddings & Lewis Machine Tool Co.
FOND DU LAC WISCONSIN

Do your machining up to 10 times faster!

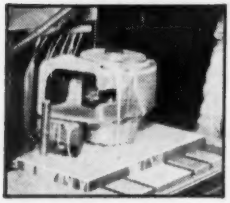


• Originally turned on lathe, now rough and finish-ground at 600 per hour.



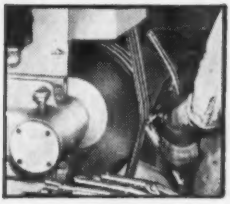
• These pieces formerly *milled* now belt-ground 5 times faster.

• Grinds broad areas flatter and faster than *radial surface grinder.*



• This grinding operation 100% faster than former *milling* time.

• Generates 2 radii at double the output by *hand filing* and *polishing.*



• Replaces *polishing jack* — eliminates costly setting up of glued wheels.

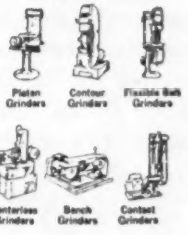
Porter-Cable ABRASIVE BELT GRINDERS

Abrasive Belt Grinding removes stock rapidly, provides fine finish free of tool marks. Greatly simplifies fixtures — or eliminates them entirely. (Often makes hand presentation possible.) Is up to 10 times faster than milling, shaping, polishing or ordinary grinding — frequently saves 75% to 90% of previous set-up time.

Wet-belt or dry-belt models (determined by material to be worked) available for flat surfacing, contour grinding, centerless grinding, generating radii, beveling, burring and polishing.

Let us prove that an Abrasive Belt Grinder can reduce the cost of many operations. Send us sample pieces for recommendations — or ask to have one of our production engineers discuss your problems at your convenience, at your plant. Free 32-page case history booklet on request.

Grinders for every application



Announcing . . .

Porter-Cable Abrasive Belt Grinders are now made and sold by Engelberg Huller Co., Inc. — manufacturers of precision machinery since 1888.

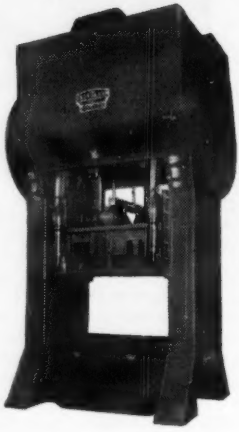
The ENGELBERG HULLER CO., INC.

110 Seneca Street — Syracuse, N. Y.

PURCHASING

has competition got you worried?

THEN take a good look around your plant! Study your machinery production records! You may need to weed out and replace costly over-age equipment that's often down for repairs and adjustment, for your best answer to stiffening competition is utmost machine efficiency. Presses are no exception!



If you use presses, let a Cleveland Engineer show you how rugged Cleveland Presses will improve your operating economy. Available in a complete selection of types and sizes, modern Cleveland Presses feature *sturdy frames, extra long gibbing* and the revolutionary *Cleveland (patented) Drum Type Friction Clutch.* Write or call today!

THE CLEVELAND PUNCH & SHEAR WORKS CO. U.S.A.

Established 1880

PUNCHING TOOLS & DIES

OFFICES AT
NEW YORK . . . CHICAGO
DETROIT . . . PHILADELPHIA
E. LANSING

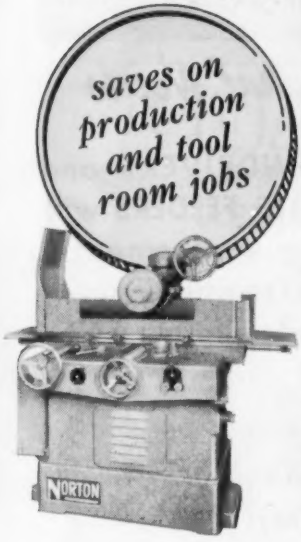
FABRICATING TOOLS

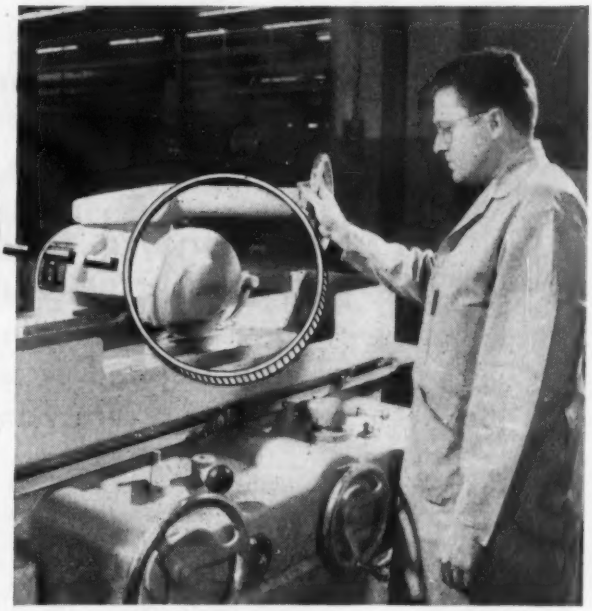
CLEVELAND 14, OHIO

• • • • • • POWER PRESSES • • • • • •

Easy to set up...
Easy to operate...

This Norton 8″ Surface Grinder





Here's a rugged machine that sets up quickly for production runs and maintains steady accuracy on small parts. And it's just as efficient for grinding a variety of small units in tool room work.

Designed with both hand and hydraulic table traverse and cross feed, the Norton 8″ x 24″ hydraulic surface grinder produces plane surfaces smoothly and speedily. Convenient controls and easy accessibility keep operating and maintenance time low — while the quick, easy set-ups cut your unit costs on job after job.

Write for Catalog 190 on this popular, money-saving Norton surface grinder, or for literature on its 6″ and 10″ companion models. And remember — only Norton offers you such long experience in both grinding wheels and machines to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.

To Economize, Modernize With NEW

NORTON

GRINDERS and LAPPERS

Making better products ... to make other products better

District Sales Offices: Worcester • Hartford
New York • Cleveland • Chicago • Detroit

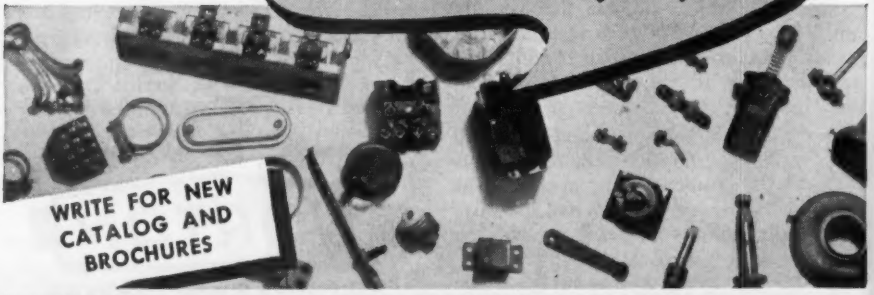
LET US ADAPT-

DPS MODERN ASSEMBLING EQUIPMENT

to Your Individual Needs

DPS POWER SCREWDRIVERS *and* SELECTIVE PARTS FEEDERS will give you outstanding performance: greatly stepped-up assembly speed, lower costs, accuracy and uniform results.

Below — a very small portion of the more than **10,000 Applications** we have done for others, We can do the same *for You!*



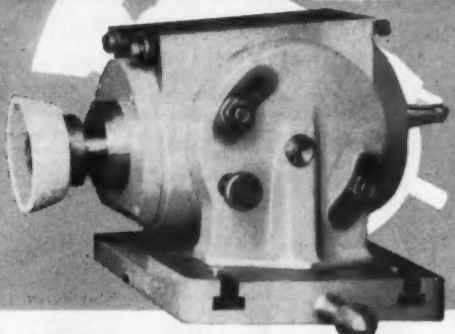
WRITE FOR NEW CATALOG AND BROCHURES

DETROIT POWER SCREWDRIVER CO.

2807 W. FORT ST. **DETROIT 16, MICHIGAN**

HERE'S A HEAD THAT TILTS

and Yours Will Nod, Too When You See What You Can Do With This One

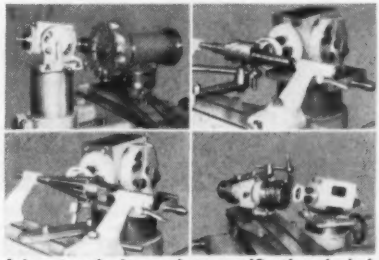


POPE SUPER PRECISION 1 HP, 3600 RPM MOTORIZED TOOL AND CUTTER GRINDER CLEARANCE ANGLE SWIVELLING HEAD

With Angular Adjustment In A Vertical Plane

Give this versatile head the nod and save time and money these seven ways:

1. You can use cup wheels for practically all clearance angles and thus produce a cutting edge on tools that lasts longer because it is stronger.
2. You can keep the tooth rest on the center line of the cutter for practically all grinding on centers or in the work head.
3. You can grind most cutters and reamers all over *with a single set-up* using the swivelling table and Pope tilting head.
4. You can read all clearance angles directly in degrees from the scale provided on the head. No more mistakes.
5. You can get the right clearance angle on such tough grinding jobs as slab mills, taper reamers, angular cutters and form tools.
6. You have one safe speed — 3600 RPM — for all wheels generally used on cutter grinders. Heat checking of cutters is virtually eliminated.
7. You have a head that's so easy to adjust and use it saves you time and money every time you grind a tool.



Ask us to submit complete specifications including price and delivery.

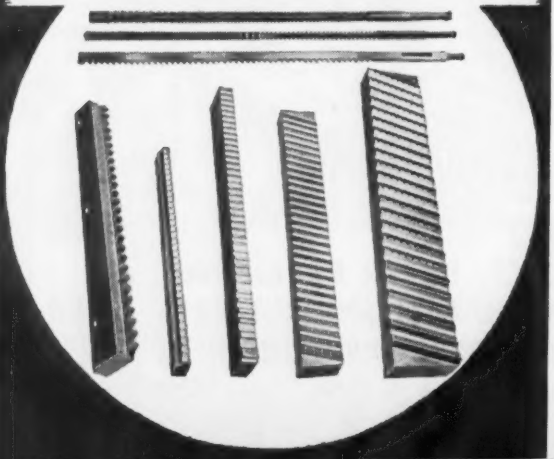
No. 101

Specify **POPE®** PRECISION SPINDLES

POPE MACHINERY CORPORATION
Established 1920
261 RIVER STREET · HAVERHILL, MASSACHUSETTS

American BROACHES

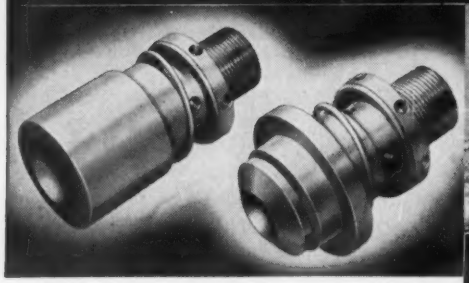
LAST LONGER ★ IMPROVE FINISH ★ REDUCE RESHARPENING



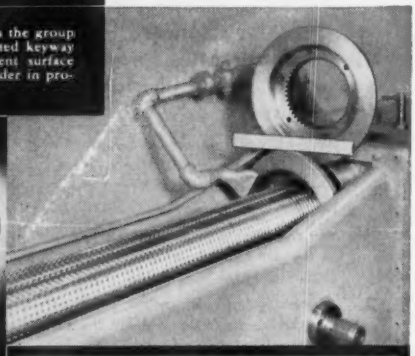
Shown above are a variety of *American* broaches. Included in the group are a round spline broach, a combination internal and inverted keyway broach, and a keyway broach. Also five sections of different surface broaches. In use, these sections are mounted in a broach holder in progressive stages to form a complete unit.

For every broaching operation, you are sure of better performance and longer life when you specify *American* broaches. *American* broaches give you efficient, dependable production on every type of broaching operation—on keyways, on internal operations such as splines and finishing holes, and surface operations on flats, cams, or irregularly shaped parts.

For the greatest broach economy, efficiency and dependability, insist on *American* broaches, made by a company with more than a quarter of a century's experience in the design and manufacture of broaches, broaching machines, and fixtures.



American offers a complete line of push and pull heads to help you get maximum value from your broaches. All types are available, correctly designed for round, flat, keyway, spline, and odd-shaped broaches. A free catalog gives complete data on *American* push and pull heads. Write for your copy today. Ask for Circular



More than 35,000 gears have been broached to date on this *American* broach, and the broach still has a life expectancy of 35,000 more. The secret of obtaining high production from a well-made broach is proper sharpening at regular intervals. For best results, follow the manufacturer's instructions implicitly: improper sharpening can ruin a good broach. Send for *American's* free catalog on broaches. Just ask for Circular

American BROACH & MACHINE CO.

A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

ANN ARBOR, MICHIGAN

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

SUNDSTRAND

A new addition to the **LENOX** *family*

ARBOR SCREWS INTO BODY OF SAW, SECURED BY TWO DRIVE PINS

TOUGH ALLOY STEEL BACK

ELECTRIC WELDED HIGH SPEED STEEL EDGE

SHATTERPROOF

SEND FOR LENOX HOLE SAW BULLETINS AND LITERATURE TODAY!

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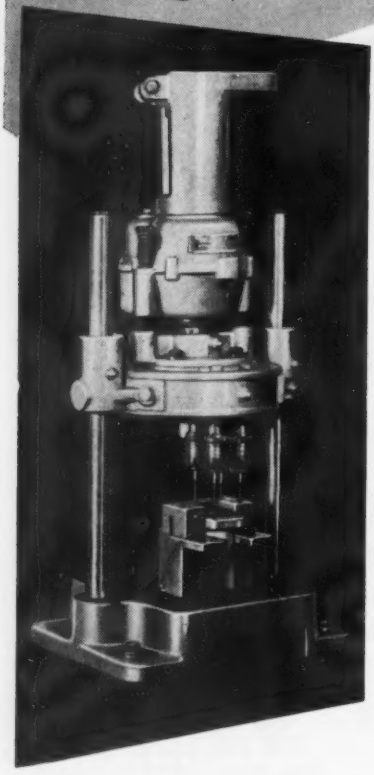
AMERICAN SAW & MFG. COMPANY
SPRINGFIELD MASSACHUSETTS

BAND SAW BLADES · HACK SAW BLADES · GROUND FLAT STOCK · HOLE SAWS

PUT DRILLING AND TAPPING ON A LOW-COST, MASS PRODUCTION BASIS WITH . . .

Ettco-Emrick



"UNIT-ENGINEERED" MULTIPLE HEADS

Ettco-Emrick Multiple Heads make possible *highest tapping* and *drilling production* right on the ordinary drill presses every metal working shop has. In fact with them, production increases of 300% or more with proportionate savings in time and cost are commonplace.

Results like these are possible because each Ettco-Emrick Multiple Head is built to meet the requirements of each specific job. The basic components, including head and work-holding fixture, are designed as a complete integrated unit to make the feeding, the drilling or tapping, and the ejection process as fast and as easy as possible.

Because standardized parts are used throughout and because the Units can be used on any standard drill press, your initial outlay is surprisingly small. It will pay you to check into these modern, mass production tools today.

FOR RECOMMENDATIONS

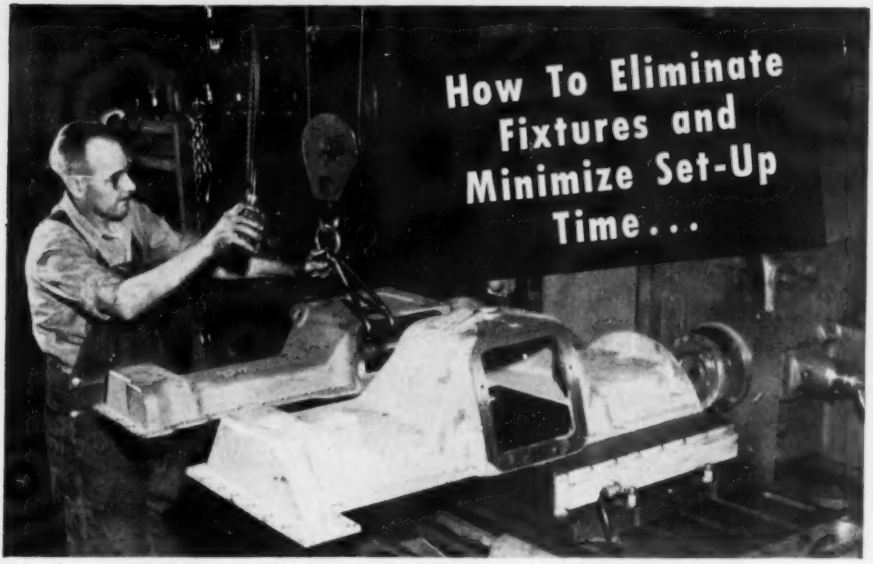
. . . and detailed cost estimates, give your local Ettco-Emrick distributor a drawing of your part giving center distances, essential tap or drill data and the required production per month or per year. He'll do the rest.

For more complete information write for Bulletin No. 3.

Ettco-Emrick

ETTCO TOOL CO., INC. 598 Johnson Ave., Brooklyn 37, N. Y.

DETROIT • CHICAGO • WORCESTER • SAN GABRIEL, CALIF. Dealers throughout the United States and Canada



With Sundstrand Magnetic Chucks

Here's how Caterpillar Tractor Co. uses Sundstrand magnetic chucks to eliminate fixtures and cut down set-up time. A pair of chucks are used as a permanent set-up for milling the bell end flange on 26 different oil pans. Prior to installation of the Sundstrand chucks, their pans required 7 different fixtures and from ½ to 1½ hours set-up time. With magnetic chucks, a throw of a switch will secure or release either or both pans instantly. If you have milling or grinding operations in your plant it will pay you to investigate Sundstrand magnetic chucks.

Free Data

Write for this new magnetic chuck bulletin — contains useful information on the complete line of Sundstrand Power-Grip Chucks. Ask for bulletin 548-M.

SUNDSTRAND POWER-GRIP ®

SUNDSTRAND
Magnetic Products Co.
Division of Sundstrand Machine Tool Co.
1020-9th ST. • ROCKFORD, ILLINOIS

Have You Tried a NORBIDE® Dressing Stick?

Just a couple of passes with a NORBIDE Dressing Stick . . . that's all it takes to . . .

Clean up a wheel face

Form a radius or groove

Touch up a cup or saucer

A NORBIDE Dressing Stick of Boron Carbide — the hardest man-made material — will outlast hundreds of ordinary dressing sticks.

With this light, handy stick you can see more of the wheel and thus avoid costly overdressing. You'll find it will greatly reduce dressing dust nuisance also.

Order a supply of these cost-cutting sticks from your local Norton distributor, or write for Form 1567 giving more details.

NORTON COMPANY, 49 New Bond Street, Worcester 6, Mass.

NORTON® BORON CARBIDE

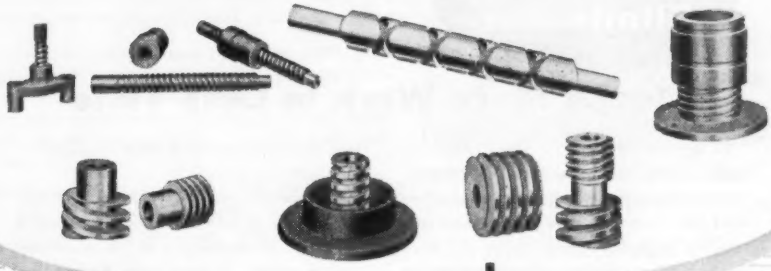
Next to the diamond in hardness — available at a fraction of diamond cost

The COULTER "L1" AUTOMATIC THREADING LATHE

. . . is so versatile that hundreds of diameters and lengths of threads can be produced on it, without limitations . . .

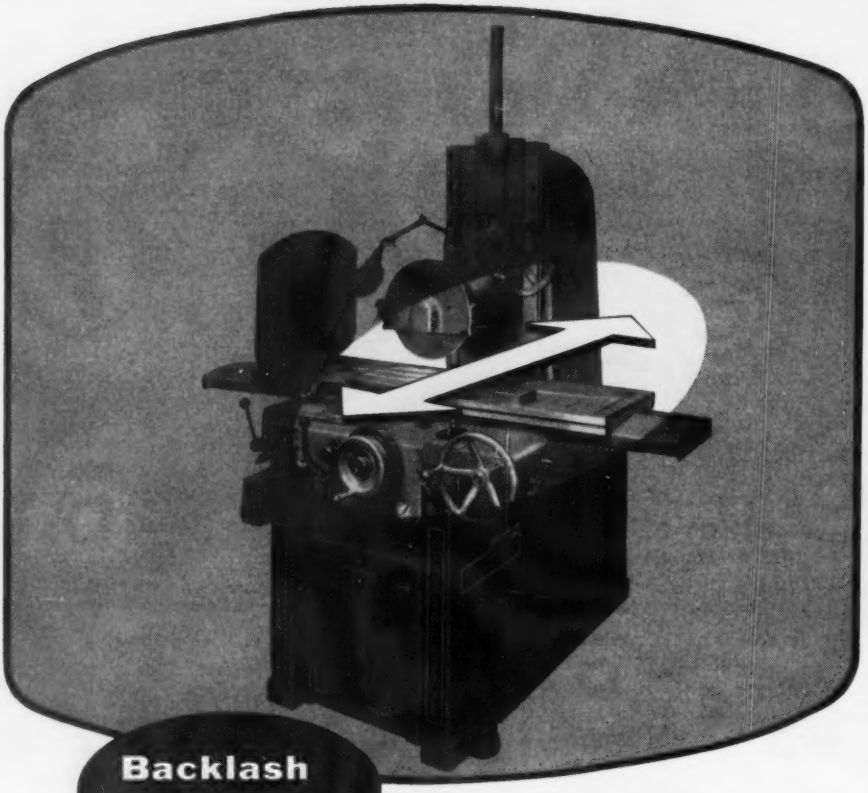
FASTER — ACCURATELY — AUTOMATICALLY!

It could be your solution to low cost threading! GET the facts!



The James Coulter Machine Co.
641 Railroad Ave. Bridgeport 5, Conn.

Machine Tool BUILDERS Since 1896



Backlash Eliminator

Means More Work in Less Time

An important feature of the *1218 Hydrabrasive Surface Grinder* is its crossfeed backlash eliminator. Instead of having to "back off" the crossfeed adjustment and "come up" to the proper setting each time, the backlash eliminator permits fast precision tranverse adjustments in either direction. You can be sure a movement of .0001" on the crossfeed handwheel equals a .0001" movement of the saddle.

This is another reason why the 1218 Hydrabrasive turns out so much work so accurately, and so easily. For detailed catalog on this fine, modern surface grinder, write Abrasive Machine Tool Company, 20 Dunellen Rd., East Providence 14, R. I.

ABRASIVE
ACCURACY BOOSTS PRODUCTION

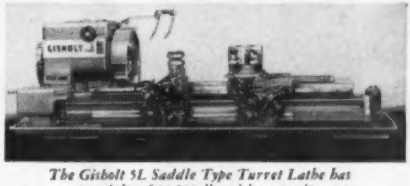
Abrasive Quality is Reflected in the Finish of Your Product

"Here's why GISHOLT insists upon the HEAVIEST CASTINGS!"

Look at them . . . castings for the heaviest saddle type turret lathes in the business! Look at all the angles:

First, note how the headstock is cast integrally with the bed for perfect spindle alignment . . . how cross supports give the most solid base for carriages, tools and slides . . . how extra-heavy webbing gives the headstock the ruggedness to support powerful gear train members.

Remember, too, that cast iron absorbs vibration. The heavier the better! And Gisholt controls the quality of the finest nickel semi-steel in its own foundry.



The Gisholt 5L Saddle Type Turret Lathe has a net weight of 22,500 lb. without equipment.

What does it mean to you? You can load up your Gisholts with carbides and really turn out the chips! You've got the strength, the rigidity and the freedom from vibration to take all the speed you can get from today's carbides—with the heaviest feeds—and still have the safety margin to take care of tomorrow's tool bit developments.

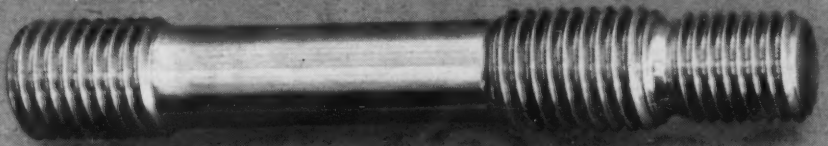
GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Threading that's tough...or

Threading that's fussy...



it's just another job for

Here's why so many shops standardize on the Namco VERS-O-TOOL system

- One set of ground thread chasers produces more threads than 10 sets of radial hobbed and lapped chasers.
- The Namco Vers-o-tool System (with its patented Micrometer Grinding and Checking Gauge) takes the guesswork out of chaser grinding, for chasers are ground on their holding blocks so that when replaced in the head they will cut identical threads—without making trial cuts—without adjustments—without time or scrap loss.
- **Standard stockable NC and NF Chasers, also National Taper Pipe and Dry Seal carried in stock.**

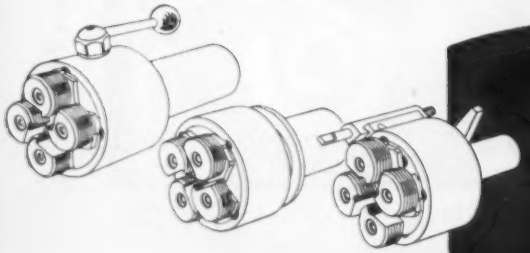
VERS-O-TOOL

These are all Class 3 threaded parts from 347 stainless steel—special threads having rounded tops and bottoms and with 32 micro finish specified.

No every day jobs to handle, these pieces, because the work-hardening tendencies of the material under cutting pressures call for the right tools and special caution to maintain the class and finish demanded.

Plenty of shops experimented with various methods of thread chasing and grinding but it remained for Screw Products Company in Cleveland to lick the job. They are using standard Vers-o-tools for diameters to 1″ with standard ground thread circular chasers and are "having no trouble at all".

Doesn't this suggest your inquiry on threading work, either tough and fussy jobs or run of mine? Catalog DT-52 will help.



The NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS

1-4-6 and 8 Spindle • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • Limit, Motor Starter and Control Station Switches • Solenoids • Contract Manufacturing.

EXCEL No. 6 PAYS *BOTH WAYS*

TOOL & CUTTER GRINDING HEADQUARTERS in the smaller shop—

EXTRA SHARPENING SERVICE in the larger plant—

An outstanding value in price and performance! The Excel No. 6 Universal Cutter and Tool Grinder will accurately sharpen reamers and milling cutters in a wide variety of shapes and sizes. A full line of attachments is available for a multitude of applications including cylindrical and internal grinding. Base optional.

Builders of Precision Grinders for 79 Years

Swings work.....8" dia. x 16" long
Face mill capacity.....12" dia.
Table surface.....4" x 24"

PROMPT DELIVERY FOR DEFENSE

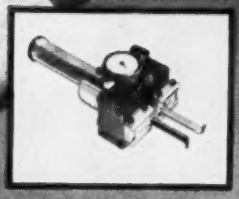
COVEL PRECISION GRINDERS

BENTON HARBOR — MICHIGAN

DRILL GRINDERS
CUTTER & TOOL GRINDERS
HYDRAULIC & HAND FEED SURFACE GRINDERS

Write for **BULLETIN** E-104

BRYANT GROOVE GAGE

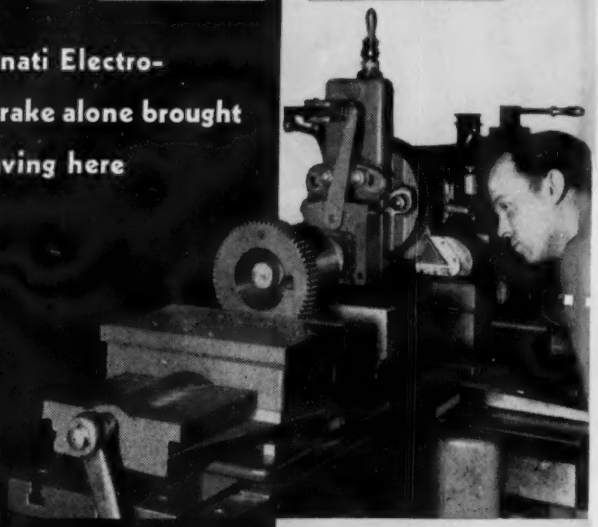


This Bryant gage checks the diameter and roundness of internal grooves up to 5". Four sets of segments are adjustable to cover the range of standard "O" ring grooves and four different sets are adjustable to cover the range of snap ring grooves. A movable segment actuates the dial indicator which gives direct reading of any variation from basic size.

Bryant Chucking Grinder Co., Springfield, Vermont, U. S. A.

Outstanding Time Saver...

The New Cincinnati Electro-Magnetic Clutch and Brake alone brought a 30% time-saving here



The New Cincinnati Magnetic Clutch and Brake, with its single, convenient control lever, gives the operator the fastest, simplest and most accurate control of his Shaper and converts waste time into productive time.

This powerful clutch and brake requires no adjustment, and has a long, maintenance-free life.

Write for Cincinnati Shaper Catalog N-6.

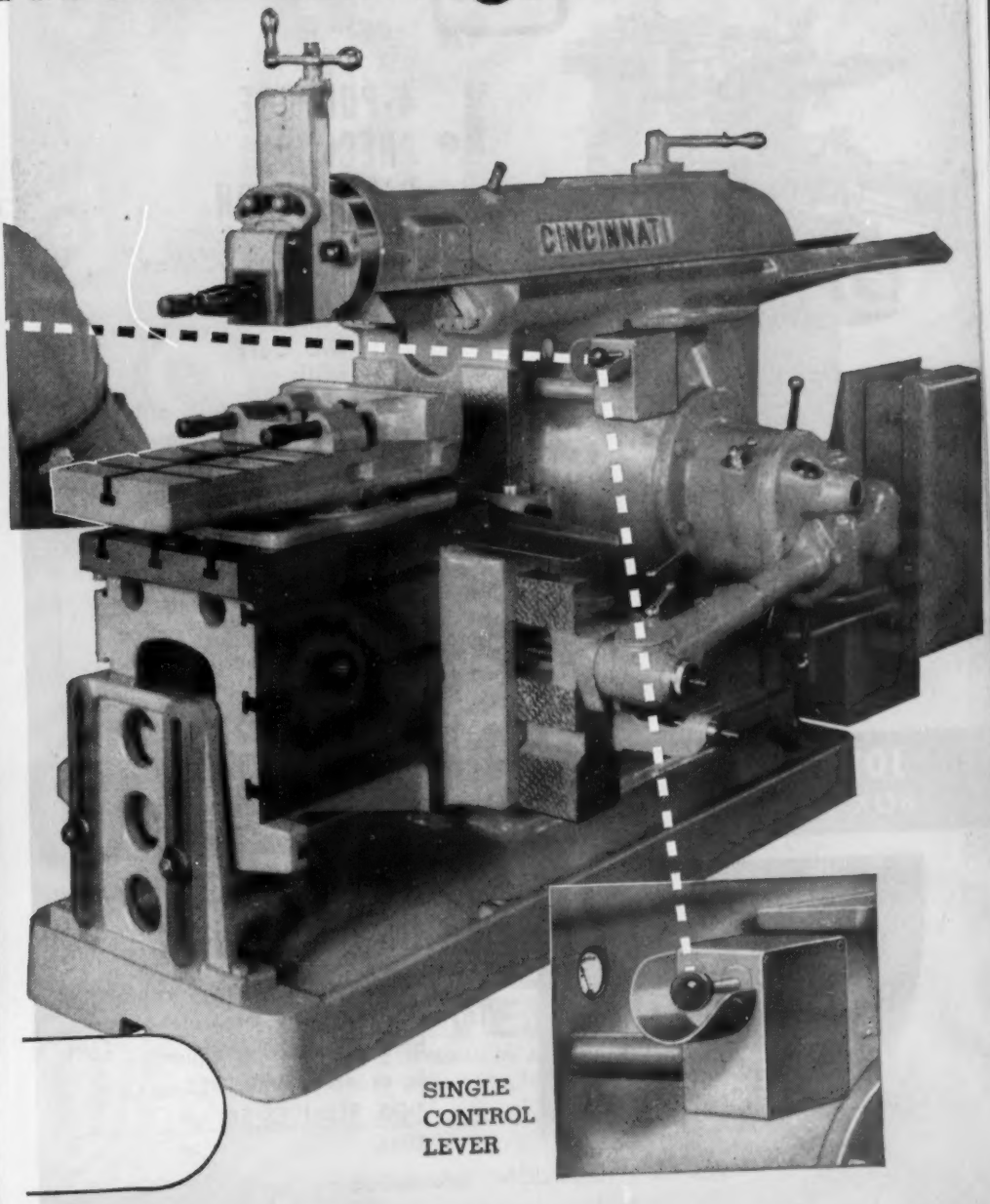
Shaping time on 7 internal oil grooves in these steel sleeves was reduced from 12.5 minutes to 8 minutes, by the Cincinnati Electro-Magnetic Clutch and Brake.

CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

...Outstanding ACCURACY



SINGLE
CONTROL
LEVER

FROM J&B

1. 4-PURPOSE PRECISION PANTOGRAPH

The *"Panto-Miller"*

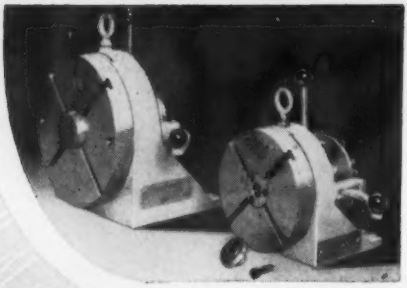
- **Engraves**
- **Profiles**
- **Die Cuts**
- **Mills**

A sturdy, production tool for 2-dimensional cutting in steel, cast iron, non-ferrous metals and plastics.

Pantograph reductions from 1:1 to 1:40. Spindle speeds infinitely variable from 1,200 to 11,500 RPM without belt changing.

Extreme accuracy and freedom of motion. Write for "Panto-Miller" details.

JOHNSON & BASSETT, INC. *Production Tool Div.*
BOX 1251, WORCESTER, MASSACHUSETTS, U. S. A.



2. RAPID, ACCURATE JIG POSITIONING

This indexing trunnion, with station selector, accurately holds and locates either jig or work. SIMPLIFIES JIGS. REDUCES SET-UP TIME.

Ask for "TRUNNION" information

The new Air Bore Gage brings to small run jobs the basic advantages of the Dimensionair's stable accuracy, precisely calibrated scale, fast set-up, and long range.

THESE ARE

NEW

Adjustable AIR BORE GAGES

Get the advantages of extreme accuracy at low cost on smallest production runs

A MAJOR ADVANCEMENT IN AIR GAGING, Federal's Adjustable Air Bore Gages bring the sensitive accuracy and high magnification of the DIMENSIONAIR measuring system to job or to production runs. FOUR GAGES COVER A MEASURING RANGE FROM ½" TO 8". Their light weight makes them very easy to handle. Particularly in the larger sizes and where holes with large diameters are difficult to reach, these light weight gages provide a convenient, non-fatiguing method of checking holes with air.

Since the centralizing contacts are concentric with the axis of the gaging contacts, the gages can be set with gage blocks and measurements transferred to a hole with no significant error. Repetitive accuracy is outstanding. Learn more about this latest development in air gaging. Write

FEDERAL PRODUCTS CORPORATION
41410 Eddy St., Providence 1, Rhode Island

All models of Adjustable Air Bore Gages are regularly furnished with Tungsten carbide gaging contacts. These gages can be used with either the 2500 TO 1 MAGNIFICATION or 5000 TO 1 MAGNIFICATION Dimensionairs, including those now in use throughout industry.

Ask **FEDERAL**

FOR ANYTHING IN MODERN GAGES...

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting or Automatically Controlling Dimensions on Machines

LONG FACED

OVER YOUR TOOL STEEL FLAT STOCK ?

...THEN TRY ATKINS Silver Steel®

- Oil hardening, electric furnace tool steel made to rigid specifications —latest metallurgical development.
- Precision-ground on all four surfaces. Sides parallel and square, free of defects and decarburization.
- Hardens deeply with closely refined grain structure—unusually tough!
- Withstands many grinds—gives long production runs.
- Tendency to warp or change dimensions as result of heat treatment is negligible.
- Now available in all standard sizes.

Use for dies in operations such as: Blanking • Trimming • Punching • Forming • Piercing • Perforating • Embossing . . . any work that demands accuracy. Cutting and finishing non-ferrous metals—particularly brass and bronze.

Call Your Atkins Distributor

ATKINS SAW DIVISION
BORG-WARNER CORPORATION • Indianapolis 9, Ind.

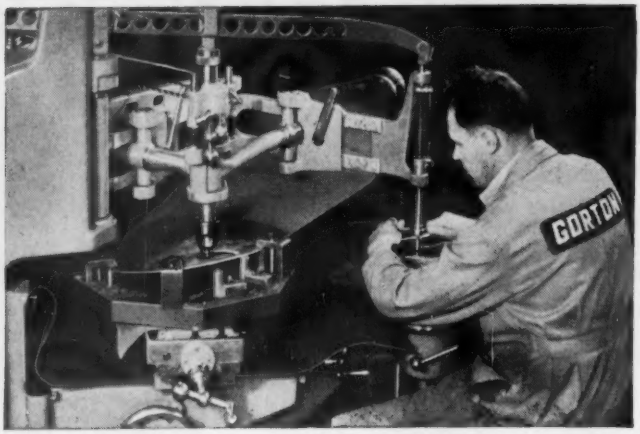
Each year more and more firms are discovering COMTORPLUG

"PACKAGED PRECISION"

NEEDS NO WIRES, HOSE, ELECTRONIC GEAR OR HEAVY BASE

REQUEST NEW BULLETIN NO. 48

COMTOR CO. 64 FARWELL ST., WALTHAM 54, MASS.



Tracer-Controlled Pantograph cuts and rounds thermal slot in 8-foot steel propeller blade in 40 minutes; previous time was 5 hours, 10 minutes — just one of hundreds of examples of time and cost saving with tracer-controlled Pantograph machines.

Pantography IS NEW —

By George Gorton III
Executive Vice President
George Gorton Machine Co

— in the sense that industry at large and Metal Working people in particular are just beginning to appreciate the many advantages Pantography offers to those faced with the Design-Production problems of today and tomorrow.

INDUSTRY'S foremost responsibility right now is to produce faster, to highest quality standards and at lower cost — whether on defense contracts or for our civilian needs.

Today, there are literally thousands of operations being performed throughout industry which can be speeded up, improved in quality and lowered in cost by the use of available models of special machine tools. The modern tracer-controlled Pantograph machine is such a tool. It is both a special purpose machine, ideal for short runs, and it is an accurate single purpose machine which turns out identical parts or pieces to meet tight production schedules.

The tracer-controlled Pantograph machine is used for inside and outside profiling, routing, die sinking, mold cutting, counterboring, contour milling, chamfering, grooving, graduating and engraving in ferrous and non-ferrous metals, as well as in plastics.

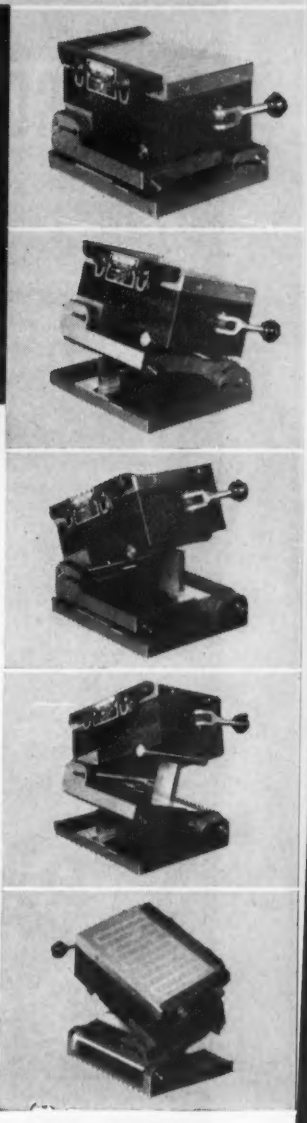
This machine performs on flat, uniformly curved, cylindrical, spherical or irregular shapes — it works in either 2 or 3 dimensions, in all directions on a horizontal plane, and vertically. It employs enlarged masters, templates or patterns which are quickly and easily made and operates normally at a reduction ratio thereby increasing accuracy — exclusively characteristic of the pantograph.

Single or repetitive accuracy — from one piece to thousands — manual or full automatic operation depending upon quantities — work sizes from the size of a dime to as large as 10 feet.

A new booklet, "Pantography," explains the process and shows what this type of machine can do for you. It is yours without obligation. Write for it today. If interested, also ask for our latest General Catalog 1655. Address the George Gorton Machine Co., 1710 Racine St., Racine, Wisconsin, U. S. A.

Industry's most versatile Magnetic Chuck

MAGNA-SINE



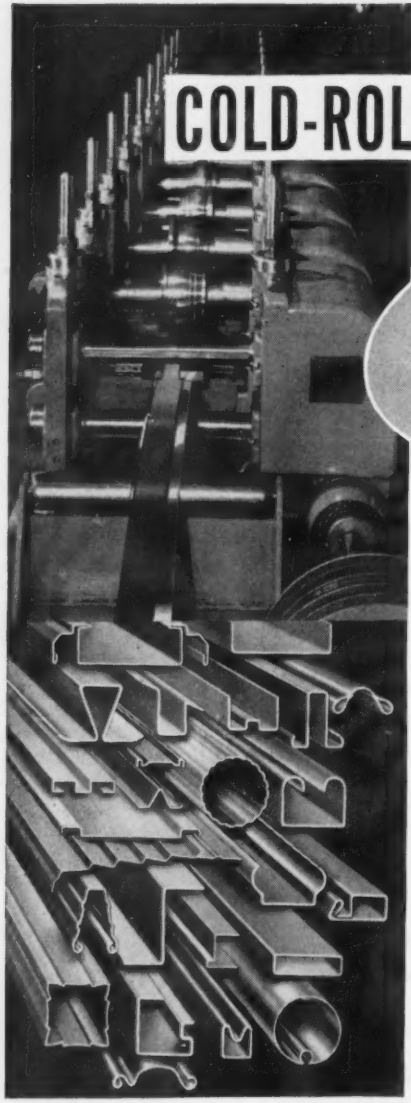
Here is a magnetic chuck that not only handles your parallel work but angular work, too. And angular set-ups to gauge block accuracy take but a matter of minutes!

Any angle—single or compound—is set up by inserting gauge blocks between the Magna-Sine's precision hinged base plates. Correct blocks to use are indicated in Table of Constants provided. Hours of set-up time are saved, angular accuracy is positive, work is held distortion-free on permanent magnet chuck.

Thousands in use for grinding, inspection, drilling, boring.
Write for free catalog which shows all styles and sizes . . . price list included.

OMER E. *Robbins* COMPANY
Dept. B-2, 24800 PLYMOUTH RD. • DETROIT 28, MICH.

Also producers of special gauges and fixtures



COLD-ROLL FORMING...

a CHALLENGE *and a* PROMISE

● Cold Roll Forming holds a perpetual challenge to your skill and ingenuity in devising new ways to step up production and reduce cost. Infinite possibilities are suggested by thousands of existing applications in the high-production metal working industries.

New applications are constantly being discovered. Total production of Yoder cold roll forming machines now runs into billions of feet annually.

A Yoder roll forming machine can be arranged for doing other operations, such as notching, embossing, perforating, curving, coiling, welding, etc., at little or no extra labor cost. Yoder engineers are at your service in designing such multi-purpose production lines.

The Yoder Book on Cold Roll Forming discusses its varied functions and advantages, with scores of photos illustrating end uses of roll formed products. Ask for it.

THE YODER COMPANY
5532 Walworth Avenue • Cleveland 2, Ohio

Complete Production Lines

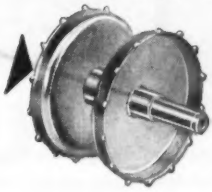
- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS - cold forming and welding

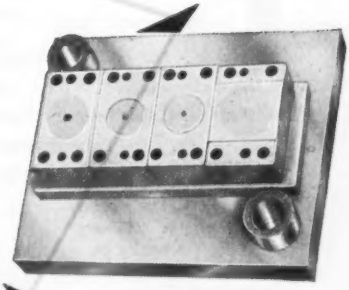
ENGINEERING YODER MANUFACTURING

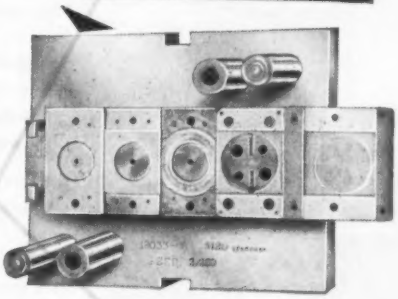
LUX CLOCK
keeps a date with

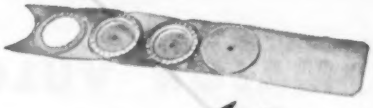
PRODUCTO

New design DIE SETS









In order for the date band on this Lux "date-minder" calendar clock to operate evenly and line up accurately, it is essential that the date drum sprockets, above, be concentric. This accuracy can be traced directly to the Producto die set which controls the stamping of this part. With a center hole tolerance of .001 and with a 6000-per-hour stamping speed, it is easy to see why the die set must be a highly precise, yet rugged, instrument.

Producto new design die sets combine precision machining and boring; close-tolerance, individual honing of pins and bushings; plus a "reserve strength" feature, into a carefully assembled and inspected product — your long-run guarantee of stamping accuracy and insurance against die breakage.

Whether catalog or special, every Producto die set is an instrument of precision.

For die set accuracy . . . call your nearest Producto branch.

FOR PRECISION DIE SETS *FAST*, CALL...

THE PRODUCTO MACHINE COMPANY • 910 Housatonic Ave., Bridgeport 1, Conn.

ALSO MAKERS OF DIE ACCESSORIES, FEEDING EQUIPMENT, VISES, MACHINERY

PRODUCTO

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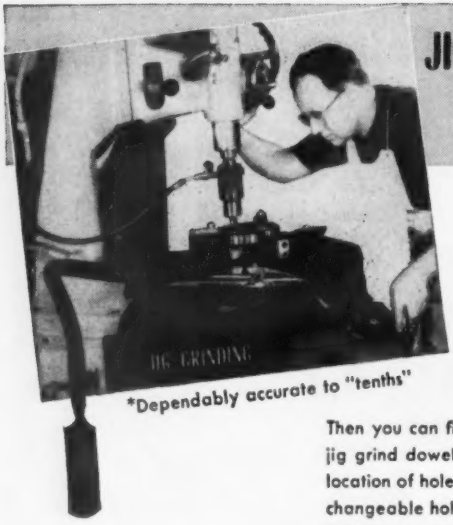


JIG GRINDING ACCURACY *guaranteed**

*Dependably accurate to "tenths"

EASILY CONNECT

this jig grinder to jig borer or mill (The "Vulcanaire" has infinite controlled speeds 30,000 to 65,000 R. P. M.)

Then you can finish grind in hardened steel to "tenths" . . . jig grind dowel holes square with a ground base . . . move location of holes in hardened steel blocks . . . jig grind interchangeable holes in hardened sections . . . grind small holes with diamond impregnated mandrels . . . grind contours and relief with tungsten carbide burrs . . . grind radii in die sections . . . eliminate jig bushings in tools where close spacing is essential.

For immediate quotation please state machine tool application. Get this manual of photos showing operations Vulcanaire performs. *Dependably accurate to "tenths"

Other infinitely controlled air driven spindle applications

Place spindle on most any machine. Use it for finishing contours on hardened steel working surfaces . . . burring or milling die castings . . . routing wood contours . . . carbide milling or finishing slots . . . finishing holes in hardened steel to "tenths" . . . grinding with diamond wheels, carbide burrs, or diamond impregnated mandrels.

Vulcanaire

It's built by toolmakers for toolmakers

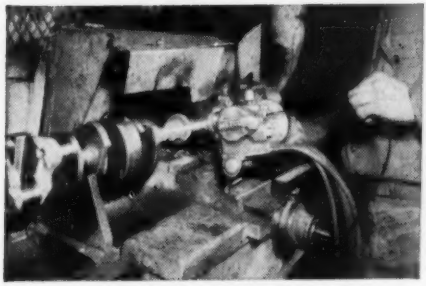
Advantages—10 micro finishes using carbide mills . . . 6 micro finishes using mounted points, operates at any angle . . . air driven, air cooled, overheating prevented . . . speed controlled at optimum point . . . 3 3/16" long motor uses little working space . . . By controlling speed at any point you abolish need for many constant speed spindles.

MAJOR VULCAN SERVICES

Engineering, Processing, Designing and Building, Special Tools, Dies, Special Machines including the Vulcan Hydraulics that Form, Pierce, Assemble and Size.

VULCAN TOOL CO. • PRITZ AND HIGHLAND • DAYTON 10, OHIO

when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. **You haven't just salvaged a part—you've improved it.**

Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

DON A. WATSON
METALLIZING ENGINEERING CO., INC.
1111 Prospect Ave., Westbury, Long Island, N. Y.

☐ Please send me Bulletin 57-C.

☐ Please have Metco Field Engineer call.

Name_____

Company_____

Street_____

City_____ Zone____ State_____

Metallizing Engineering Co., Inc.
1111 Prospect Ave., Westbury, L. I., New York • cable: METCO
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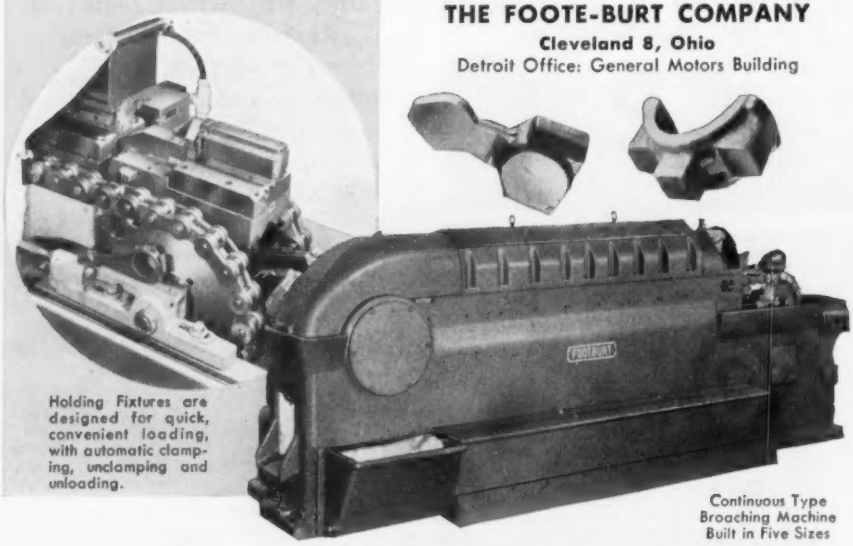
METALLIZING EQUIPMENT COMPANY, LTD. – Chobham near Woking, England

machining connecting rods and caps an opportunity for SURFACE BROACHING

Surface Broaching is a modern machining method that in many cases shows reduced costs through higher production, finish to closer tolerances and low tool maintenance costs. If you machine large quantities of duplicate parts we will be glad to work with you on the possibility of adopting Footburt Surface Broaching Machines. Send us blueprints and hourly production requirements for our recommendations.

THE FOOTE-BURT COMPANY
Cleveland 8, Ohio
Detroit Office: General Motors Building



Holding Fixtures are designed for quick, convenient loading, with automatic clamping, unclamping and unloading.

Continuous Type Broaching Machine Built in Five Sizes

FOOTBURT

SURFACE BROACHING

Smith & Mills SHAPERS

Rugged power for "roughing." Sensitivity for accuracy and fine surface finishing. Exclusive solid ram for stamina, low maintenance and easier adjustment. Standard and heavy duty models for modern tool room and production service.

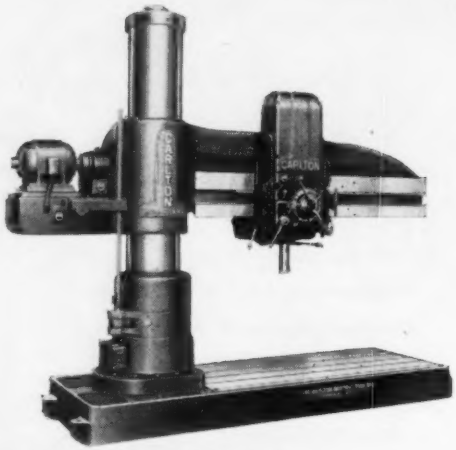
SIZES
16"
20"
24"
25"
28"
32"
36"

PLAIN TABLES • TILTING TABLES
UNIVERSAL TABLES

The Smith & Mills COMPANY
affiliated with Bryant Machinery & Engineering Company
General Office: 640 W. Washington Blvd., Chicago 6
EXCLUSIVE REPRESENTATIVES THROUGHOUT THE WORLD

Fine Shapers since 1888

Only one can be called "the finest"

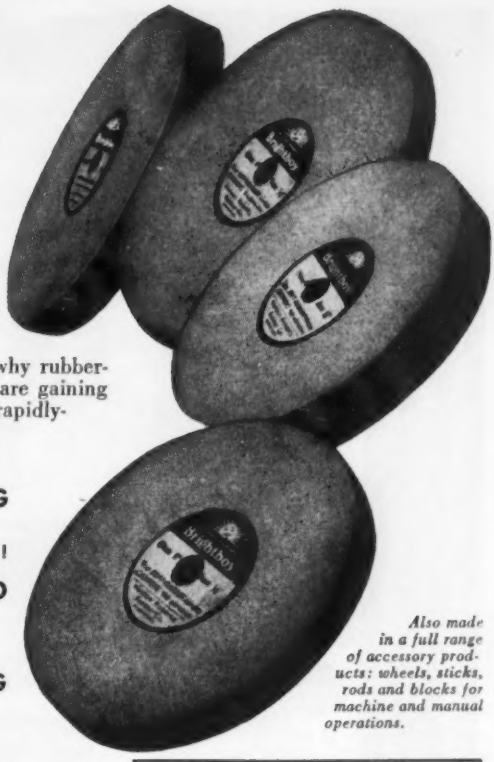


CARLTON is "the One"

Why? For many reasons: automatic positioning of arm, hardened wear strips, counterbalanced spring for compensating for heavier tools, built-in light in head, push-button control, precision power clamping of column, arm and head, automatic lubrication. These and the many other Carlton advantages explain Carlton's top performance. You're sure to find your most economical size here, too, because the Carlton line includes arm lengths from 3-ft. to 12-ft., column diameters from 9" to 26". Write today for descriptive literature. The Carlton Machine Tool Co., Cincinnati 25, Ohio.

Carlton *radial drills*

WHEEL RIGHT UP TO GREATER PROFITS!



Also made in a full range of accessory products: wheels, sticks, rods and blocks for machine and manual operations.

These are mighty convincing reasons why rubber-cushioned Brightboy Abrasive Wheels are gaining wider and wider acceptance among a rapidly-increasing number of industrial users.

BURRING, FINISHING, CLEANING, POLISHING —In one operation

Time savings frequently as much as 50%!

***THE ABRASIVE "MATCHED" TO THE JOB**

—for faster, finer work

UNBELIEVABLY-NEW WORKING ACTION WITH EXTENSIVE ADAPTABILITY

Simultaneous abrasive-and-rubber action, bridging the gap between the grind and the buff. Frequently achieves the final polish. For a wide range of metals, plastics and laminated materials. Goes far beyond other methods. Brings you an entirely new and refreshing concept of finishing.

TRY A TEST! Get all the facts on Brightboy rubber-cushioned finishing from your dealer. Ask him for Brightboy literature. Write us if he cannot supply you. Get our advice on any problem where finishing is involved.

***NEW! STOCK ABRASIVES "MATCHED" TO YOUR PARTICULAR FINISHING REQUIREMENTS**

RUBBER-CUSHIONED BRIGHTBOY NOW AVAILABLE IN EITHER ALUMINUM OXIDE OR SILICON CARBIDE GRAIN

***and*— Each of these compounds comes in GRAIN SIZES ranging from EXTRA FINE TO EXTRA COARSE in SOFT, FIRM and TOUGH RUBBER BINDERS.**

Brightboy

RUBBER CUSHIONED ABRASIVES

BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street • Newark 7, N. J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

Precision Spindles

with

endless versatile variations

- MODERNIZE YOUR OLD MACHINE TOOL WITH ONE OF THESE SPINDLES.
- DEVELOP YOUR OWN SPINDLE WITH ANY COMBINATION ILLUSTRATED.
- OUTLINE YOUR PROBLEM—WE WILL DESIGN AND BUILD A SPINDLE FOR YOU.

the STANDARD electrical tool co.

2487 RIVER ROAD • CINCINNATI 4, • OHIO

SEE US IN BOOTH 1028, METAL SHOW, CHICAGO, NOV. 1-5

Reduce Broaching Costs
ON SMALL JOBS

OIL GROOVES
•
SMALL SPLINES
•
SERRATIONS
•
KEYWAYS
•
SLOTTING
•
BURRING
•
SIZING HOLES

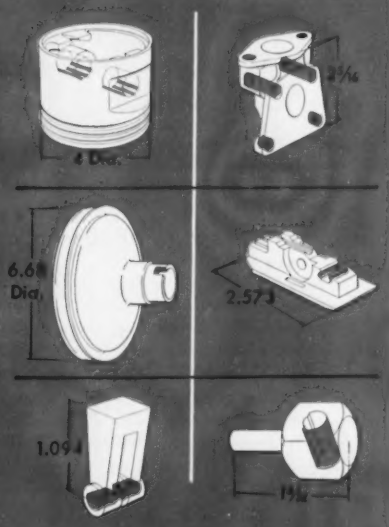
Here is your opportunity to reduce machine time and cut production costs on those small broaching jobs. And you avoid tying up your regular broaching machines which are built for heavier work.

The Red Ring Self-Contained Broaching Fixture is a compact, portable, bench-type unit. Specifically designed for a particular job, it has all the elements (automatic and manual) of any well designed fixture. A pneumatic cylinder is added to pull or push the broach. Just connect it with the air supply and you are ready to start broaching.

These Red Ring Fixtures are used on a wide range of small jobs requiring a "Pull" not to exceed 2000 lbs. and a stroke of 25" or less. Here they are highly effective and very economical.

Investigate—talk with a Red Ring Engineer or write for Bulletin B54-9.

6993



NATIONAL BROACH AND MACHINE CO.

5600 ST. JEAN . . . . . DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

520 CUTS

IN AN 8-HOUR DAY...

Angles, Bars, Channels and Beams

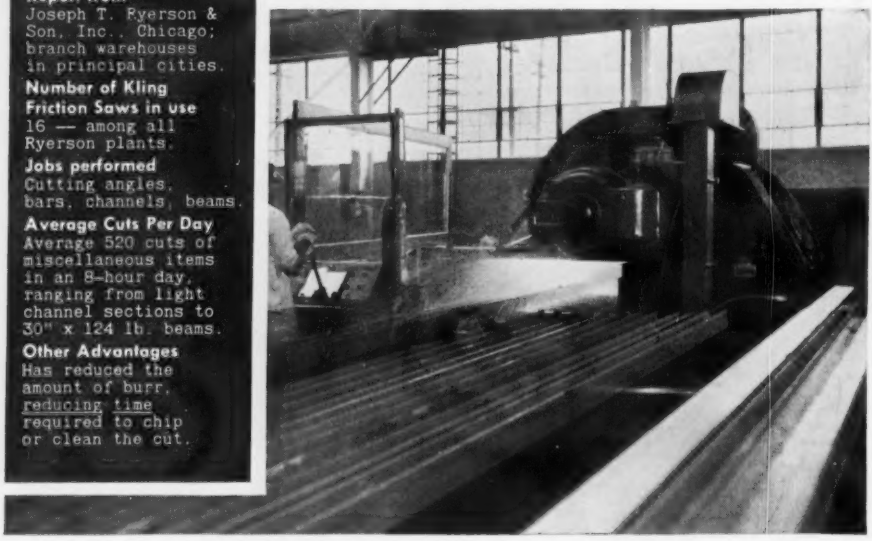
Report from
Joseph T. Ryerson & Son, Inc., Chicago; branch warehouses in principal cities.

Number of Kling Friction Saws in use
16 — among all Ryerson plants.

Jobs performed
Cutting angles, bars, channels, beams.

Average Cuts Per Day
Average 520 cuts of miscellaneous items in an 8-hour day, ranging from light channel sections to 30" x 124 lb. beams.

Other Advantages
Has reduced the amount of burr, reducing time required to chip or clean the cut.



Kling HIGH SPEED FRICTION SAWS

increase cutting production **FOR "THE BEST OF COMPANIES!"***

Greater cutting speed with all types of steel . . . versatile ability to cut many different kinds of structural shapes... cleaner cutting . . . and lower investment in initial equipment—these are some of the advantages that attract industrial plants and steel warehouses like Joseph T. Ryerson & Son, Inc.—to the use of Kling Friction Saws.

One Kling High Speed Friction Saw can handle a volume of cutting that would otherwise require several shears or other type saws. Consequently, Kling Friction Saws make possible faster cutting of structural shapes without changing set-up, than any other known process.

The reason for the exceptional speed of Kling Friction Saws is, that they operate on a principle practically the opposite of the ordinary tool or conventional saw. Friction sawing concentrates the heat on the material to be severed, at a rate which is faster than it can absorb heat. The process is not new, but has been applied successfully for years.

** Some of the companies using Kling Friction Saws:*

Allis-Chalmers Mfg. Company · A. M. Castle & Company · Bethlehem Steel Inc.
Douglas Aircraft Co., Inc. · Kyle & Company · L. B. Foster Company
Lone Star Steel Company · Madsen Iron Works Inc.
Jos. T. Ryerson & Sons, Inc. · Stephens-Adamson Mfg. Company
The H. M. Harper Company · U. S. Steel Corporation

Complete Friction Sawing Information FREE! Write for Bulletins that tell you in detail, exactly how Friction Saws work and what they can do in your shop to save you time and money.

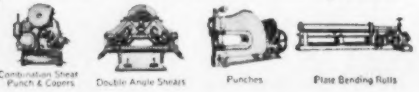
KLING BROS. ENGINEERING WORKS • 1320 North Kostner Avenue, Chicago 51, Illinois

Export Distributor: Simmons Machine Tool Corporation, 50 East 42nd St., New York 17, N. Y.

Since 1892

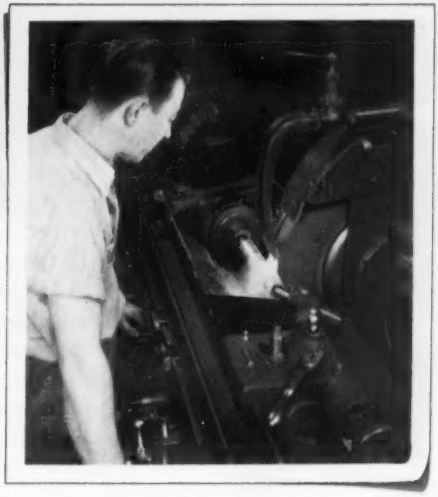
Kling

...an investment in speed!



651MMRP

Just as a photograph negative assures positive duplication...



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Cincinnati Grinding Wheels offer

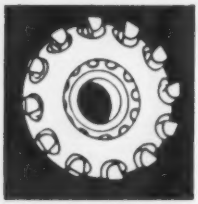
PD POSITIVE DUPLICATION

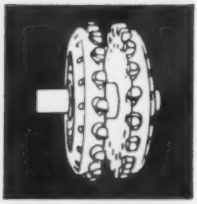
Here is an achievement in precision manufacturing and quality control that will save you money and increase your production. For the CINCINNATI (PD) Manufacturing Process assures a Positive Duplication of the original wheel *every* time you reorder.

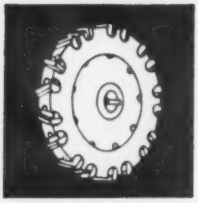
"On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind *exactly alike*. Yet they *are priced no higher than ordinary wheels.*

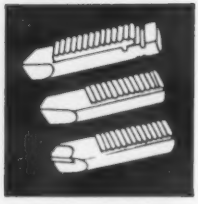
Let us prove to you how CINCINNATI (PD) WHEELS will make money for you. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or 'phone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati, 9, Ohio.

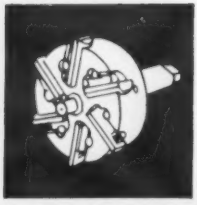
CINCINNATI
Grinding Wheels
THE CINCINNATI MILLING MACHINE CO.
Cincinnati 9, Ohio











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Lovejoy Cutters are your best buy!

Lovejoy milling cutters offer eight important advantages which help you achieve maximum accuracy, dependability, production and profit from your milling machines.

1 All Lovejoy cutters are insert-tooth type. Only worn out blades need be replaced—*not* the entire cutter.

2 Serrations are on front of each blade—plain back makes full contact with body.

3 Positive-locking device on the blades assures rigidity, even on heavy intermittent cuts.

4 Advancing, replacing and sharpening of blades is fast and accurate.

5 Extra rugged blade and body design assures maximum results.

6 H. S. S., alloy and carbide-tipped blades available promptly from stock.

7 Lovejoy design is tops for blade interchangeability.

8 Lovejoy has had 35 years of experience—can help *you* get best results from *your* milling operations.

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LOVEJOY TOOL COMPANY, INC.

MAKE ACCURATE TESTS ANYWHERE!

WITH *Ames* PORTABLE
HARDNESS TESTERS

Ames Portable Tester making hardness test on large casting while being machined.

You can get accurate, dependable tests anywhere, anytime, with Ames Portable Hardness Testers. No delays, no waiting for laboratory tests, no cutting off specimens. Anyone can operate.

Ames Testers are light in weight — may be taken to the work — read directly in the Rockwell Scales. Are made in sizes from 1″ to 8″ capacity for testing rounds, flats, sheet stock, tubing, odd shaped pieces and assembled parts.

Look into this time-saving, inexpensive method of making your hardness tests today. Thousands in every day use. Send for folder "Rockwell Hardness Testing Made Easy".

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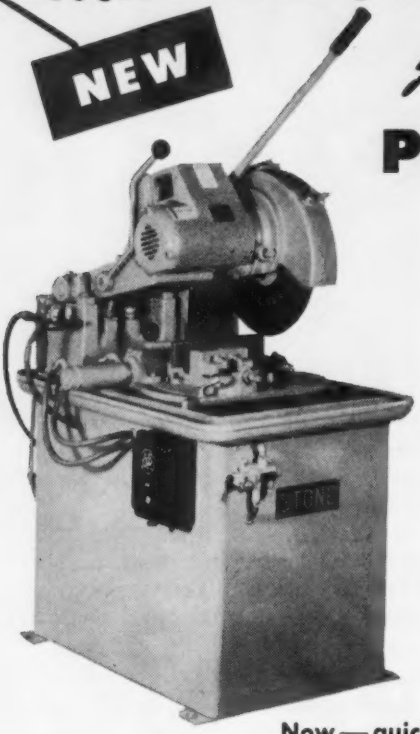
AMES PRECISION MACHINE WORKS
Makers of Ames Precision Lathes and Bench Millers
WALTHAM 54, MASSACHUSETTS

NEW



Automatic

POWER-FED Cutting Head

for STONE Model M-75

ONE SIMPLE LEVER FOR AUTOMATIC CUTTING

You Save **up to 25% on wheel costs with power feed!**

Now — quicker — safer — cutting with controlled feeds, gives even greater efficiency to Stone High-Speed cutting equipment. The automatic feed improves the quality of cut, eliminates operator fatigue, increases production rates and increases wheel life.

AVAILABLE AS OPTIONAL EQUIPMENT ON NEW MACHINES OR AS SEPARATE UNIT FOR INSTALLATION ON PRESENT MACHINES.

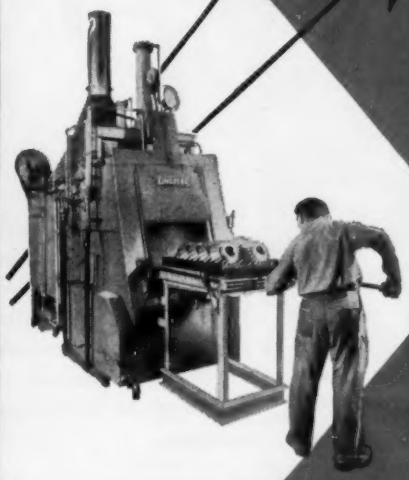
Write Today For Complete Information

STONE MACHINERY CO., INC.

Fayette St. Manlius, N.Y.

5 FURNACES IN ONE

the *LINDBERG* Carbonitriding Furnace



Yes, it's many furnaces in one! It's designed not only for carbonitriding . . but also for hardening, carburizing and carbon restoration. It's self contained . . it's easy to maintain!

10 reasons why Lindberg Carbonitriding Furnaces are better

1. Heating is by new type, gas-fired, vertical radiant tubes. They weigh only 29 pounds each . . can be changed in two minutes.
2. Vertical radiant tubes last longer . . often two or three times as long.
3. Quench tank is built-in . . no costly excavation or piping necessary.
4. Quench tank has fin type oil cooler . . maintains oil at proper temperature.
5. Specially designed chamber purges work before it enters heating chamber.
6. Special check-light system tells you where charge is at any given time.
7. Control of heating and quenching cycle is automatic.
8. Lindberg Carbonitriding Furnaces are made for automatic, semi-automatic, or manual charging.
9. Lindberg Carbonitriding Furnaces have been tested under three years of rough operating conditions.
10. Lindberg "Hyen" generators which supply atmosphere for Lindberg Carbonitriding Furnaces are instantly adjustable for many different types of atmospheres.

For full details, ask for bulletin #241

LINDBERG FURNACES

Lindberg Engineering Company • 2469 West Hubbard Street • Chicago 21, Illinois

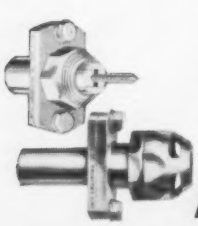
ALCO
DRILL CHUCKS

COMPLETE RANGE
OF SIZES FOR DRILLS
FROM 1/32" to 1"

ALCO Drill Chucks hold drills securely without using bushings. This chuck is full floating so that absolute concentricity is maintained, resulting in precision drilling.

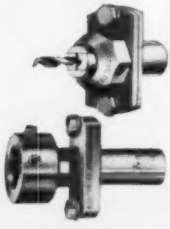
ALCO Drill Chucks fit all screw machines and each size has a wide range of adjustability so that one chuck will hold various sizes of drills. Your drills will last longer because they will run true on centers, and will produce perfect work.

Send for complete catalog or any engineering data.



THE ALCO TOOL COMPANY
52 Birdseye St., Bridgeport, Conn.

ALCO EFFICIENT TOOLS



what's so different about

Piercing Color TV Chassis?

Color TV chassis are produced in small lots—require frequent engineering changes—setups and production tools are high cost operations.

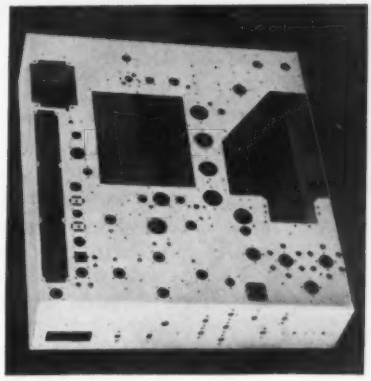
THE WIEDEMANN RA-41P TURRET PUNCH PRESS economically produces chassis and panels in small lots for

COLOR TV
RADAR
FIRE CONTROL
COMMUNICATIONS
BUSINESS MACHINES
AIRCRAFT

and many other applications

because:

- **Setup time is low**
- **Initial tooling cost is low**
- **Punches and dies are re-used on other jobs so tooling cost soon becomes a negligible factor**
- **Engineering changes are accomplished without delay to production schedules and at low cost**
- **Complete flexibility—close hole centers—20 hole sizes in sheets to 28" x 40" in single handling—40 to 60 holes per minute located to plus or minus .005" tolerance**



COLOR TV BASE
Quantity 55
(Pierced on Wiedemann RA-41P)
530 strokes of press
31 different punches and dies used
(no special tools)
2 handling operations
TOTAL TIME (floor to floor)
per piece 16.25 MINUTES

These advantages combine to make the RA-41P Wiedemann Turret punch press a paying investment to all chassis fabricators, since the RA-41P is the only machine designed for economically piercing electronic chassis and panels in low runs.

WRITE FOR A COPY OF BULLETIN 241

WIEDEMANN MACHINE COMPANY

4219 Wissahickon Avenue, Philadelphia 32, Pa.

RETAIN CONTROL

with INSPECTION and CODE STAMPS

These inspection and code stamps enable a manufacturer to retain control of his product wherever it goes. A single glance can provide such information as the identity of a welder, inspector, operator, or assembler —heat number, lot number, material or date of manufacture.

Choose your own code from any of 300 stock designs, available in any desired size, in either the economical HI-DUTY Brand or even longer-lasting HI-LOY Brand. You'll get permanent identification through use of code designs, with key letters or figures if desired.

"IF IT'S WORTH MAKING, IT'S WORTH MARKING"...

Geo. T. Schmidt marking engineers will help you develop a code control plan without obligation. Write for particulars.

GEO. T. SCHMIDT, INC.

1806 West Belle Plaine Avenue Chicago 13, Illinois

First name in cutting fluids every season

You'll be reminded of cool fall breezes all year 'round when CIMCOOL° is on your broaching jobs. Because this radically new and different cutting fluid combines friction reduction and cooling capacity in a degree never before attained.

CIMCOOL reduces the distortion of the work piece because this revolutionary cutting fluid cools faster. The broaching tool also stays cool—even to the touch.

CIMCOOL is far superior to old-fashioned petroleum-based cutting fluids because it is a *chemical emulsion*. It replaces all water emulsions and all but a few highly compounded specialty oils.

We'll be pleased to *prove* how CIMCOOL does a better broaching job. For a demonstration, just write us. We'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Or, if you prefer, write for our free booklet, "Cimcool Defeats Heat." Address Sales Manager, Dept. S-104, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

°Trade Mark Reg. U.S. Pat. Off.

CIMCOOL

for 85% of all metal cutting jobs

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

500,000 PIECES . . . ELIMINATING A DRILLING OPERATION — AND WE HAVE SHARPENED THE PUNCH ONLY ONCE"

says JOHN P. CUNNINGHAM, Chief Engineer, UNITED PARTS MFG. CO., Chicago, Ill.

pivot punches

HIGH SPEED STEEL
WHIPSLEEVED
STRAIGHTGROUND

• Piercing SAE 1010 Steel with .117 diam. commercial punches resulted in runs of only 100 to 5,000 before punch breakage at United Parts Mfg. Co. Work-hardening of the hole edges also required drilling in order to avoid rupturing of the material in the succeeding extrusion operation. Scrap ran as high as 46%.

Mr. Cunningham says, "We are now using the Pivot Straight-ground Whipsleeve Punch to produce a brake adjustment boot as a replacement service part for one of the leading automobiles.

"We have pierced over 500,000 pieces and have sharpened the punch only once. We continue to be amazed at the performance of these punches.

"The straight-grinding feature also permits successful extruding and has eliminated the former drilling operation."

• For longer punch life — more punching power — greater concentricity — higher production at lower costs — use Pivot Punches.

Send for FREE new catalog including standard prices. Write Dept. M. M.

pivot punch and die corp.

NORTH TONAWANDA, N. Y.

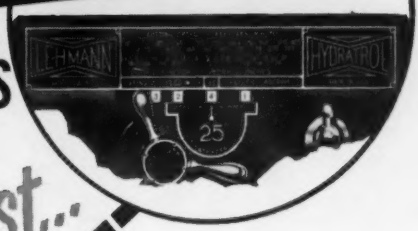
THE BIG HYDRATROL STORY:

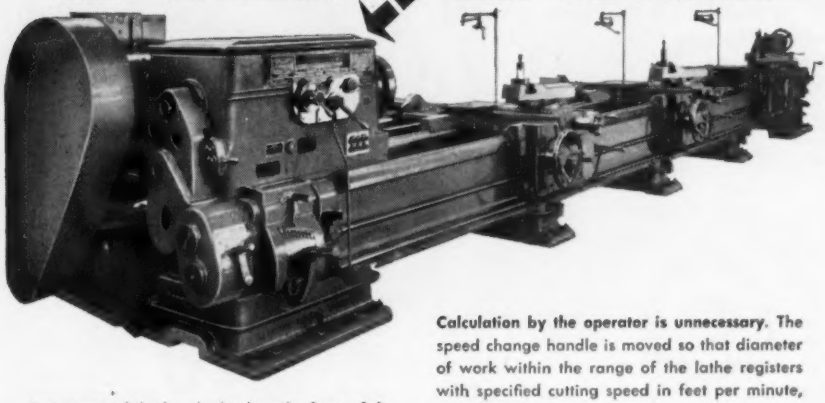
16 Spindle Speeds

with only a

Twist of the Wrist...

with This Automatic Slide Rule Selection!





Just a turn of the hand wheel on the front of the headstock of the LEHMANN Hydratrol Lathe gives you a speed change! An automatic slide rule, co-ordinated with the movement of the handle, shows spindle revolutions per minute and indicates a slide rule calculation of the cutting speeds in feet per minute.

Calculation by the operator is unnecessary. The speed change handle is moved so that diameter of work within the range of the lathe registers with specified cutting speed in feet per minute, and the lathe automatically makes the necessary change.

The rotary selector gives 16 forward and 8 reverse speeds. No need for intermediate stop; unnecessary to disengage the friction driving clutch to change speed.

Check These Other Important Advantages:

- **Safe in operation.**
- **Simplicity in construction and operation.**
- **Hydraulic friction clutches and hydraulic brakes, self-compensating.**
- **Automatic safety relay, for harmless and easy engagement of positive clutches when speeds are changed.**
- **Spindle release for chucking.**
- **Perfect, safety-control lubrication with filtered oil.**
- **Gears constantly in mesh.**

Write today for additional information or catalog—or—send prints for time-and-money-saving recommendation!

LEHMANN
MACHINE COMPANY
GRAND at CHOUTEAU • ST. LOUIS 3, MO.

DIVISION OF NOVO ENGINE CO.

over the editor's desk

Light's Diamond Jubilee

OUR recent mail contained a reminder that this is the year of "Light's Diamond Jubilee," marking 75 years of electrical progress that began with Edison's invention of the first practical incandescent lamp in 1879. The purpose of the Jubilee is to take note of the importance of electricity in so many fields of endeavor.

Roughly a century ago, 79 per cent of the total energy used for work was supplied by animals, 15 per cent by human beings, and only six per cent by machines. By 1960 it is estimated that animals will supply only one per cent of our work energy, humans only three per cent, and machines 96 per cent.

In terms of manpower, the factory worker in 1899 had the electrical equivalent of two helpers, while in 1952 he had the equivalent energy of 236 men working with him. In 1899 the worker used an average of 260 kilowatt-hours per year. In 1952, his annual average use had increased to nearly 16,000 kilowatt-hours.

Today, we see electric motors running everything from tiny scale-model trains to 5,000 h.p. locomotives. They pump oil through pipelines from Texas to New Jersey, and across the Arabian deserts. They power vacuum cleaners and run steel mills. From the local garage to the huge mills and factories across the nation, electric motors are constantly serving industrial America.

Electricity has brought light to dark factories and replaced belt-driven machinery with electrically driven production lines. Electric controls and electric heat also play a vital role in industry today.

The world is indeed indebted to Thomas A. Edison, who with his associates on October 21, 1879, completed their famous series of experiments on the incandenscent lamp. It is fitting that this day be set aside to pay tribute to them and their work.

You Are Slipping

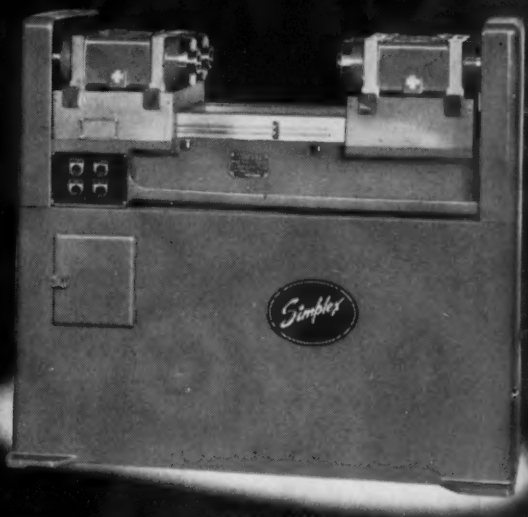
When you feel your oats and corn at the same time; when it takes you just half as long to get tired as it does to get rested; when you prefer not to have a good time than to have to get over it; when your wife tells you to pull in your stomach after you have already done so; when you pay more attention to your food than to the waitress; when you stop hoping for the best and try to avoid the worst; when you look to see if your garter is dragging when a girl takes a second look at you; and when your idea of getting ahead is staying even, and you think in terms of pension rather than passion, you are slipping, brother, you are slipping!

Simplex

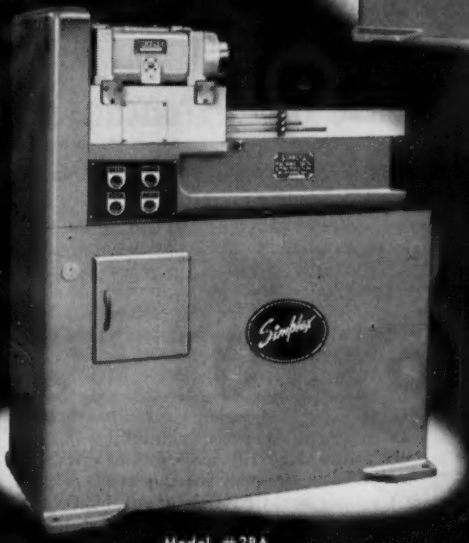
PRECISION BORING MACHINES

SPECIFICATIONS

Table Travel	15"
Table Width	13"
Size Heads	#2 or #3
Standard Feeds	1" to 9"/min.
Special Feeds	2" to 18"/min.



Model #2BDA



Model #2BA

The new SIMPLEX 2BA and 2BDA Precision Boring Machines are offered at a price that will prove attractive to any shop. These machines provide for a complete automatic cycle at a low cost and can be operated by inexperienced help. The automatic cycle consists of rapid traverse, feed, dwell, and rapid return. After the start button is initially pressed, the above mentioned cycle is controlled by the position of trip bars which actuate limit switches. Feed rate changes can be accomplished during setup through use of feed change gears.

Write for Catalog

SIMPLEX MACHINE TOOL CORPORATION

4540 WEST MITCHELL STREET

MILWAUKEE, WISCONSIN

PRECISION BORING MACHINES • PLANER TYPE MILLING MACHINES
SPECIAL DRILLING, TAPPING AND BORING MACHINES

ARMSTRONG
WRENCHES

Choose Your Wrenches as you do your friends--for life

Specify ARMSTRONG Wrenches for lifetime service, for finely balanced tools that feel right in the hand and make work easier, faster and less fatiguing. ARMSTRONG Wrenches generally are longer for size—give greater leverage. Accurately milled or broached openings give the proper clearance. They are safe wrenches because they are strong beyond need.

Drop forged and machined from high tensile carbon or special alloy tool steels, ARMSTRONG Wrenches are heat treated, tempered and tested to an exact balance of toughness, hardness and tensile strength. Each is beautiful in finish and line, is a quality tool to be proudly possessed by any mechanic—or certain to "give a lift" to any assembly line. Buy wrenches which carry the trade marks HI-TEN or ARMALOY. On carbon or alloy steel wrenches these trade marks are your guarantee of lifetime quality

WRITE FOR CATALOG

ARMSTRONG BROS. TOOL CO. *"The Tool Holder People"* 5228 W. ARMSTRONG AVENUE CHICAGO 30, ILL.

MODERN Machine Shop

Vol. 27, No. 5
OCTOBER, 1954

features in this issue

The Span System of Measuring Involute Gear Tooth Size *By Joseph E. Van Acker*
A condensation of a paper delivered by the author at a recent meeting of the American Gear Manufacturers Association, this well illustrated article describes a system of measurement that is applicable to spur or helical gears of all pitches, all pressure angles and odd or even numbers of teeth, operating at standard center distances. Page 116.

Precision Spindles and Their Application *By John E. Hyler*
Covered in this article is a wide variety of precision spindles available for use in surface grinders, boring machines, tool and cutter grinders, internal thread grinders and other types of equipment, including their operation, construction features and methods of driving. Page 126.

Rx for High Tool Costs *By Gilbert C. Close*
The author describes a "temporary tooling" technique for producing stampings to specifications that is designed to reduce tool costs on short-run work. Page 138.

Machining Stainless Steel *By G. J. Stevens*
This case history presents a solution to a poor surface finish problem encountered in boring stainless steel castings on a vertical milling machine. Page 146.

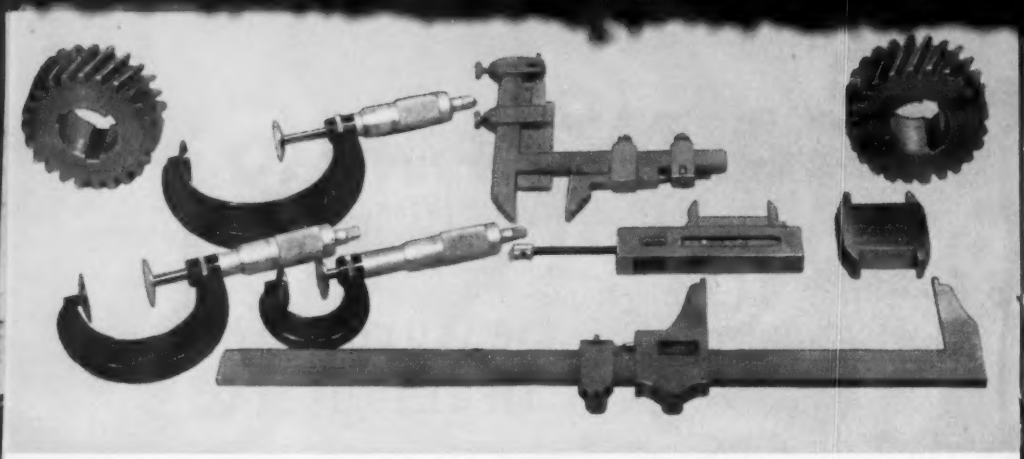
Savings through New Tax Law Depreciation Methods *By H. E. Carroll*
Those measures of the new tax law which most vitally affect purchasers of new equipment are concisely covered in this report. Page 152.

How to Assure Quality Production through Tool and Gage Control *By Thomas J. Bizzoco*
The purpose of this article is to discuss a virtually foolproof system for tool, instrument and gage control, featuring economy and practicability of operation. Page 160.

Simple Methods for Handling Sheet Metal Work *By F. E. Riley*
The author presents two helpful suggestions for handling frequently-encountered sheet metal jobs in shops not ordinarily equipped to perform such work. Page 176.

The Fire Insurance Underwriter Looks at Machine Shops *By Clarence T. Hubbard*
In this presentation, the author points out ways in which machine shop operators can reduce their fire insurance costs by good housekeeping and the utilization of available fire engineering service. Page 182.

Producing Clutch Parts on Air-Controlled Machine Tools
This article explains how an eastern manufacturer effectively utilizes air power to minimize operator fatigue in manufacturing heavy duty truck clutches. Page 188.



Assortment of tools suitable for span measurement.

The Span System of Measuring Involute Gear Tooth Size*

By JOSEPH E. VAN ACKER**

A condensation of a paper delivered by the author at a recent meeting of the American Gear Manufacturers Association.

THERE are many ways of measuring involute gears including the use of master gears and rolling fixtures, and measurements over pins or balls. The high cost of helical master gears and the difficulties encountered in measuring helical gears by the use of pins or balls encouraged the development of a better way—a method that would be easier to use, easy to calculate, and inexpensive. Ernest Wildhaber in 1923 published a system of measuring over two or more teeth which has been occasionally used for spur gears, and this formed the basis for the development of the Span System of gear measurement. The Span System as herein described is applicable to spur or helical gears of all pitches, all pressure angles, odd or even numbers of teeth, operating at standard center distances. Gears operated at nonstandard center distances are just as easily measur-

* *Copyright 1954, J. E. Van Acker, New Vernon, N. J.*

** *Quality Control Supervisor, Gould & Eberhardt, Inc., Irvington, N. J.*

able, but the more complex formulas for the calculation of their span dimensions are considered beyond the scope of this article.

The span system of measurement, sometimes known as the block measurement, or measurement over two or more teeth, has a universal application and a degree of accuracy that makes it almost ideal. This system permits the measurement of gears while still in the machine, and often while the machine is still running, as shown in Fig. 1. This factor alone is important enough to justify its use in every gear shop. The accuracy of measurement is not affected by outside diameter errors, including runout. No particular skill is required to obtain an accurate measurement in contrast to the sensitive touch required for measurement with single tooth calipers. Disagreement between inspectors and operators is virtually eliminated.

The Geometric basis for the Span System is shown in Fig. 2. This shows that a chord tangent to the base circle will always be perpendicular to the tooth flanks and that calipers passed over the teeth will always show a size equal to the developed length of the base circle arc subtended below and between the teeth spanned by the caliper. Notice that the caliper never makes contact on sharp corners as with ordinary tooth calipers and as far as feel is concerned, the caliper may be rocked up and down just as if you were measuring a cylinder.

In the case of a helical gear, Fig. 3, it is necessary to consider that its geometry is three-dimensional and that a line tangent to the base circle in spur gears expands into a plane tangent to a base cylinder and that the ends of the plane are cut off at an angle equal to the base helix angle. The span dimension is taken perpendicular to base helix angle, and not perpendicular to the pitch line helix angle as might be commonly supposed. The formulas to be later presented have been

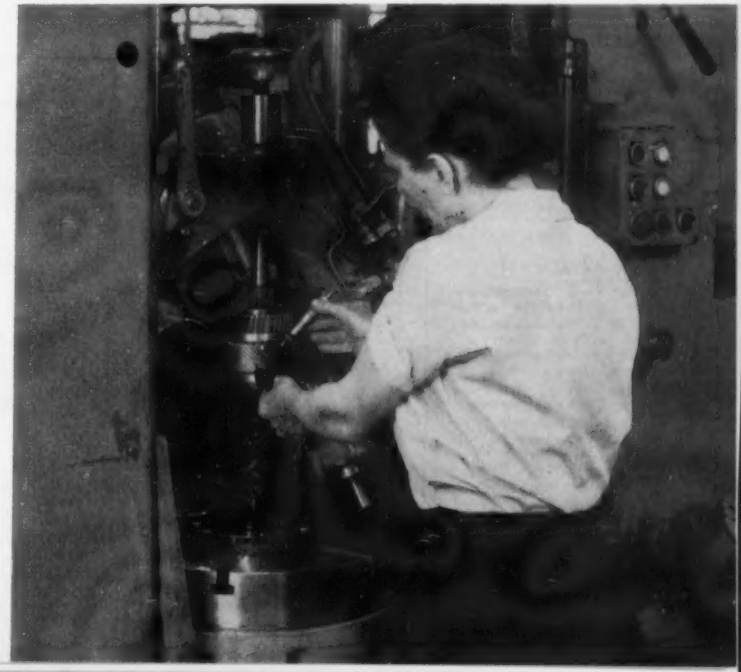


Fig. 1—The span system of measurement permits the measurement of gears while still in the machine, and often while the machine is still running.

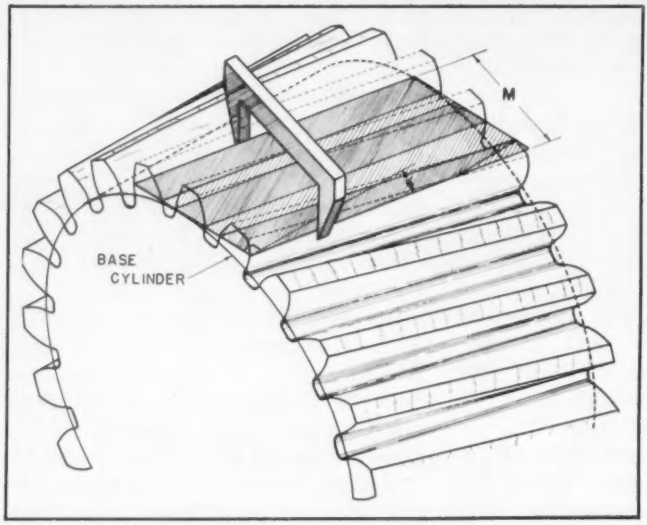


Fig. 3—If generation of an involute helical gear is described as the path of lines inclined at the base helix angle on a rigid plane rolling without slip on a base cylinder, the distance between opposing profiles will always be constant and equal to the length of the base cylinder arc subtended below the helical-gear teeth and normal to the base helix angle.

transformed to their present form to eliminate any separate calculation of base helix angle, base cylinder diameter, etc., and it develops that the helical gear formula is also applicable to spur gears. The feel when measuring helical gears is the same rolling feel as when measuring spur gears.

The span dimension is directly related to the thickness of a single tooth or the backlash which the gear carries into the mesh inasmuch as the full pitches shown in Fig. 4 are constants leaving only the thickness of a single tooth as the only variable.

The first step in calculating the span dimension is to determine the number of teeth over which the

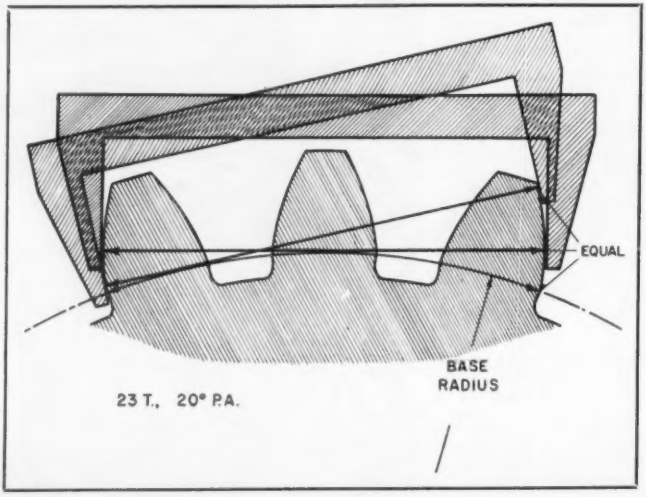


Fig. 2—If generation of an involute spur gear is described as the path of points on a rigid line rolling without slip on a base circle, the distance between opposing profiles will always be constant and equal to the length of the base circle arc subtended below the spur gear teeth within the span of a caliper.

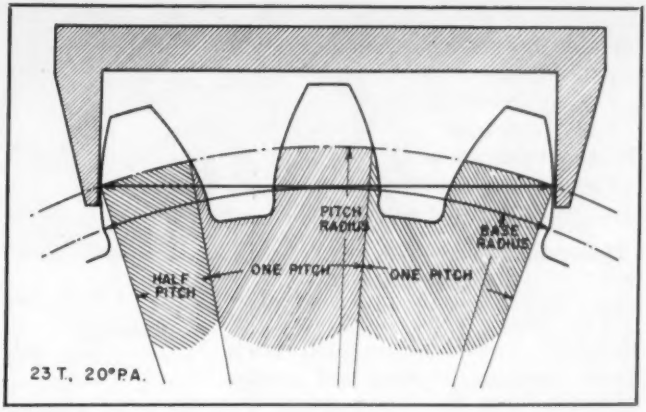


Fig. 4—The span dimension is directly related to the thickness of a single tooth or the backlash the gear carries into the mesh inasmuch as the full pitches shown in this sketch are constants, leaving only the thickness of a single tooth as the only variable.

measurement must be taken. The caliper should include all the teeth within an angle equal to twice the pressure angle (see Fig. 5) to obtain pitch line contact. This is rarely possible and for practical purposes, a span is obtained from the nomograph, Fig. 6. A straight line connected from the number of teeth in the gear on the left side of the chart through a point on the central line corresponding to the pressure angle and helix angle of the gear will pass through the graduated line on the right. The graduations indicate the number of teeth measured over, and also gives one of the elements used in the final formula for the span dimension. The exact number of teeth measured over is seldom critical and may be arbitrarily

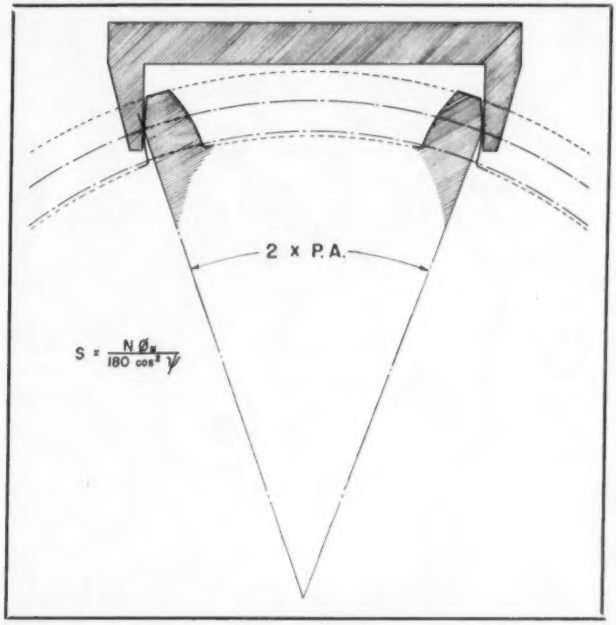


Fig. 5—The first step in calculating the span dimension is to determine the number of teeth over which the measurement must be taken. The caliper should include all the teeth within an angle equal to twice the pressure angle, as shown in this sketch, to obtain pitch line contact.

increased or decreased to overcome certain limitations encountered on nonstandard or high helic angle gears. As shown in Fig. 7, any number of teeth from two to six would be acceptable spans for this example —the backlash indicated by each span would be the same.

Determination of Span Dimension, Standard Gears

The basic span dimension of standard normal-diametral-pitch gears meshing at standard center distances can be found from the following formula:

$$M_t = \cos \phi_n \left(\frac{N \text{ inv } \phi_t + \pi S}{P_n} \right)$$

Where: M_t = the span dimension without allowance for backlash.

$\cos \phi_n$ = the cosine of the normal pressure angle and equals .96815 for 14½° PA gears and .93969 for 20° PA gears.

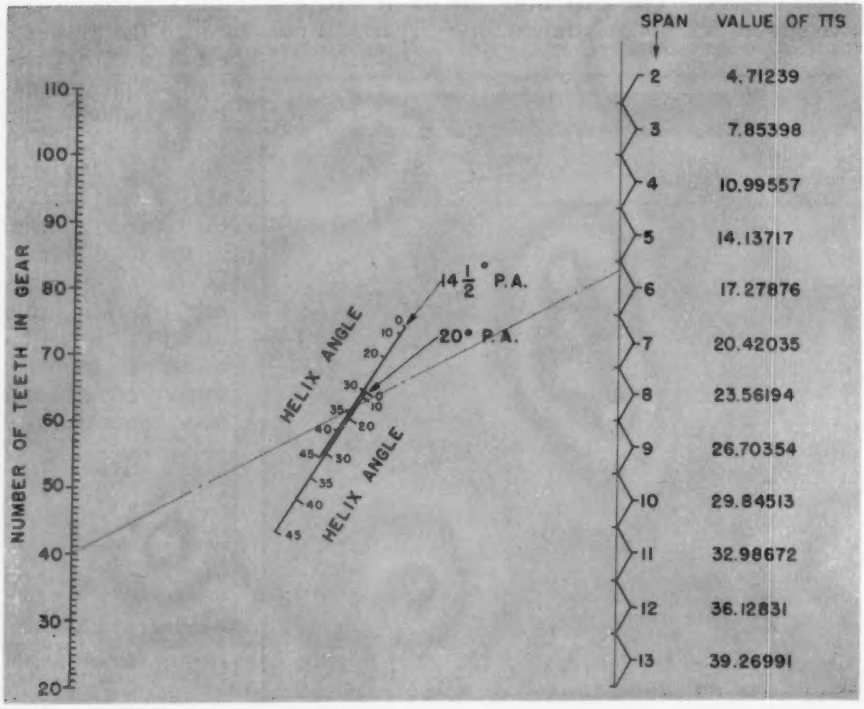
N = the number of teeth in the gear.

$\text{inv } \phi_t$ = the involute function of the transverse pressure angle and is obtained directly from Table I, appended.

πS = a costant taken from the nomograph, Fig. 6.

P_n = the normal diametral pitch of the gear.

Fig. 6—For practical purposes, a span is obtained from the nomograph, as provided herewith.



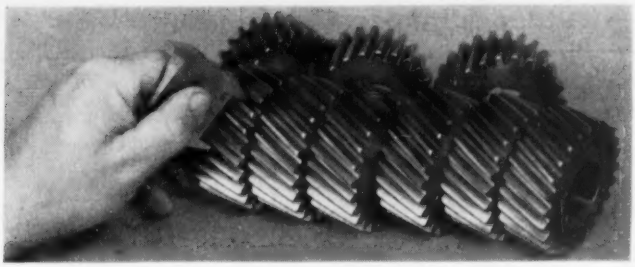


Fig. 8 — Inspecting gears by means of "go-not go" limit snap gage.

Tables

Tables of involute functions of helical gears are appended. Follow the column to suit the helix angle in the gear, then move to the right to the appropriate column for the pressure angle of the gear. For helix angles between those listed, interpolation will give results accurate for all practical purposes.

Tables of span dimensions for 1 DP spur gears have been appended. Instructions for use of these tables are included in the heading of the table.

Backlash

When a gear measures smaller than the calculated basic span dimension, the difference between the calculated dimension and the actual measured size is the normal base backlash that the one gear carries into the mesh. Normal base backlash is the actual clearance between mating gear teeth and may be considered as the amount of oil space between the mating teeth.

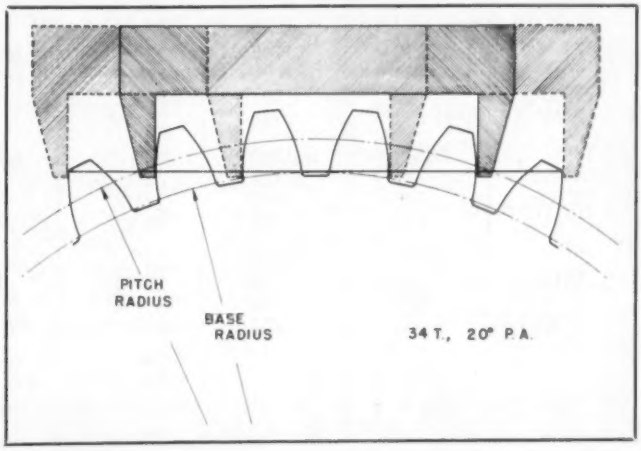


Fig. 7—As shown in this sketch, any number of teeth from two to six would be acceptable spans for the present example — the backlash indicated by each span would be the same.

Measuring the Gear

The best way to measure the gear is to use a micrometer having special extended anvils. These micrometers cost somewhat more than an ordinary micrometer, but some value lies in the fact that one micrometer can be used to measure a relatively large range of gears much larger in diameter than the nominal range of the micrometer itself. For instance, a 2-3 inch micrometer can be used to measure 20 deg. PA gears as small as 5 inches in diam-

Table I
INVOLUTE FUNCTIONS OF HELICAL GEARS

Helix Angle	14½° PA	20° PA	Helix Angle	14½° PA	20° PA
ψ	inv ϕ_t	inv ϕ_t	ψ	inv ϕ_t	inv ϕ_t
10°	.00580	.01557	20°	.00665	.01779
10°15′	581	560	20°15′	668	787
10°30′	583	564	20°30′	671	796
10°45′	584	568	20°45′	674	804
11°	.00585	.01571	21°	.00678	.01813
11°15′	587	575	21°15′	681	821
11°30′	588	579	21°30′	684	830
11°45′	590	583	21°45′	688	839
12°	.00591	.01587	22°	.00691	.01848
12°15′	593	592	22°15′	695	858
12°30′	595	596	22°30′	699	867
12°45′	596	600	22°45′	702	877
13°	.00598	.01605	23°	.00706	.01887
13°15′	600	610	23°15′	710	897
13°30′	602	614	23°30′	714	907
13°45′	604	619	23°45′	718	917
14°	.00606	.01624	24°	.00722	.01928
14°15′	608	629	24°15′	726	938
14°30′	609	635	24°30′	730	949
14°45′	612	640	24°45′	734	960
15°	.00614	.01645	25°	.00739	.01971
15°15′	616	651	25°15′	743	983
15°30′	618	657	25°30′	748	995
15°45′	620	662	25°45′	752	.02006
16°	.00622	.01668	26°	.00757	.02018
16°15′	625	674	26°15′	762	031
16°30′	627	680	26°30′	766	043
16°45′	629	687	26°45′	771	056
17°	.00632	.01693	27°	.00776	.02069
17°15′	634	699	27°15′	781	082
17°30′	637	706	27°30′	786	095
17°45′	639	713	27°45′	792	109
18°	.00642	.01720	28°	.00797	.02122
18°15′	645	727	28°15′	802	136
18°30′	647	734	28°30′	808	151
18°45′	650	741	28°45′	814	165
19°	.00653	.01748	29°	.00819	.02180
19°15′	656	756	29°15′	825	195
19°30′	659	764	29°30′	831	210
19°45′	662	771	29°45′	837	226
			30°	.00843	.02241
			30°15′	849	257
			30°30′	856	274
			30°45′	862	290

About the Author

Joseph E. Van Acker is Quality Control Supervisor of Gould & Eberhardt, Inc., Irvington, N. J., a position which he has held for the last seven years. His previous industrial experience includes work as a machine setup man for an automotive parts company, and 4½ years' employment in the gear plant of Wright Aeronautical Corporation, mostly as supervisor of inspection. During World War II, he served as a second lieutenant in the infantry in the European theater. Mr. Van Acker is a senior member of the American Society of Quality Control, a member of the A.S.M.E. Committee B-4 on limits and fits for cylindrical parts, and a member of the A.S.M.E. Committee B-6 on worm gear standardization.

Joseph E. Van Acker

eter and 14½ deg. PA gears as large as 13 inches in diameter. Few micrometers are needed to cover a large range of work.

To make the measurement, the extended anvils of the micrometer are placed in the proper tooth spaces, all the way into the root of the gear. The micrometer is then closed up to firmly contact the flanks of the teeth. The caliper may then be rocked up and down in the same way as when getting a "feel" when measuring a cylinder — the feel is the same and the measurement should not vary. The ease of obtaining an accurate measurement has astounded many who have tried it for the first time.

Since flat parallel anvils of a micrometer can be used to measure gear size, it is just as easily possible to inspect gears by means of "go—not go" limit snap gages as shown in Fig. 8. This simplifies the inspection of gears so that the greenest trainee can satisfactorily inspect gear size at a fast rate. Inspection rates of 30 gears per minute have been maintained.

Dial indicator calipers are available for production inspection. In order to be suitable for measurement of helical gears, the calipers must be equipped with plane anvils. Pin-type-anvil calipers are suitable for the measurement of spur gears only.

Inasmuch as this article is necessarily limited in scope, additional information concerning tools, formulas for nonstandard and transverse diametral pitch gears, and more complete tables can be obtained from Sensory Devices Company, P.O. Box 204, New Vernon, New Jersey.

Example

For an example of the calculation involved, we will find the span dimension for a 40 tooth, 8 NDP, 20 deg. NPA gear having a 15 deg. helix angle.

From the nomograph, Fig. 6, determine that the measurement is taken over 6 teeth and that πS has a value of 17.27876.

From Table I find the value of inv $\psi_t = .01645$.

Table II

SPAN DIMENSIONS FOR SPUR GEARS

Span dimension without allowances for backlash can be found for "standard" spur gears by the use of simple arithmetic from the following tables. Select from the table corresponding to the pressure angle the value next to the number of teeth in the gear. Divide this by the diamentral pitch of the gear. Make allowance for backlash as required.

14½° PRESSURE ANGLE				20° PRESSURE ANGLE			
No. of Teeth	1 D P Span Dimension	No. of Teeth	1 D P Span Dimension	No. of Teeth	1 D P Span Dimension	No. of Teeth	1 D P Span Dimension
9	4.6106	41	10.8654	7	4.5262	39	13.8308
10	4.6160	42	10.8708	8	4.5402	40	13.8448
11	4.6213	43	10.8762	9	4.5542	41	13.8588
12	4.6267	44	10.8815	10	4.5683	42	13.8728
13	4.6321	45	10.8869	11	4.5823	43	13.8868
14	4.6374	46	10.8923	12	4.5963	44	16.8530
15	4.6428	47	10.8976	13	4.6103	45	16.8670
16	4.6482	48	13.9445	14	4.6243	46	16.8810
17	4.6535	49	13.9499	15	4.6383	47	16.8950
18	4.6589	50	13.9553	16	4.6523	48	16.9090
19	4.6643	51	13.9606	17	7.6184	49	16.9230
20	4.6697	52	13.9660	18	7.6324	50	16.9370
21	4.6750	53	13.9714	19	7.6464	51	16.9510
22	4.6804	54	13.9767	20	7.6604	52	16.9650
23	7.7273	55	13.9821	21	7.6744	53	19.9311
24	7.7327	56	13.9875	22	7.6885	54	19.9452
25	7.7380	57	13.9929	23	7.7025	55	19.9592
26	7.7434	58	13.9982	24	7.7165	56	19.9732
27	7.7488	59	14.0036	25	7.7305	57	19.9872
28	7.7541	60	17.0505	26	10.6966	58	20.0012
29	7.7595	61	17.0558	27	10.7106	59	20.0152
30	7.7649	62	17.0612	28	10.7246	60	20.0292
31	7.7702	63	17.0666	29	10.7386	61	20.0432
32	7.7756	64	17.0720	30	10.7526	62	23.0093
33	7.7810	65	17.0773	31	10.7666	63	23.0233
34	7.7863	66	17.0827	32	10.7806	64	23.0373
35	10.8332	67	17.0881	33	10.7946	65	23.0513
36	10.8386	68	17.0934	34	10.8086	66	23.0654
37	10.8440	69	17.0988	35	13.7748	67	23.0794
38	10.8493	70	17.1042	36	13.7888	68	23.0934
39	10.8547	71	17.1095	37	13.8028	69	23.1074
40	10.8601	72	17.1149	38	13.8168	70	23.1214

Substitute the proper values in the formula

$$M_1 = .93969 \left(\frac{24 \times .01645 + 17.27876}{8} \right)$$

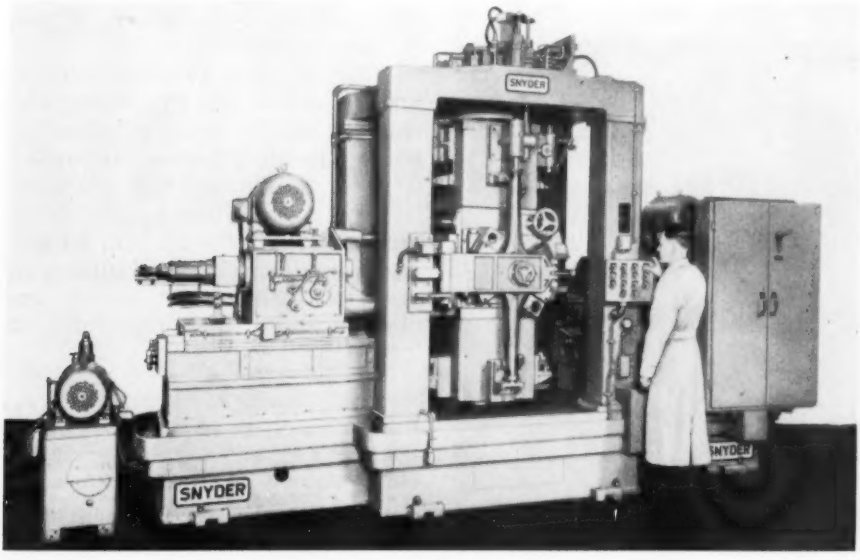
$$= .93969 \left(\frac{.39480 + 17.27876}{8} \right) = 2.0758$$

If a .002-.003 reduction for backlash is allowed, the limit dimensions for the gear would be $\frac{2.0738}{2.0728}$.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

Machine for Processing Automobile Rear Axle Housings

THIS automatic, four-station, vertical trunnion machine for processing automobile rear axle housings is unique in that the fixtures are mounted on a trunnion which is rotated upon a vertical center. The upper bearing of this trunnion is mounted in a heavy, steel plate structure which is supported by four massive corner posts, also fabricated from heavy steel plate. The index drive for the trunnion is an index-and-reset mechanism driven by a Hydro motor, and this complete mechanism is mounted on the upperside of the upper trunnion bearing plate. The three heads are mounted on three separate wing bases which are bolted to the central base upon which the trunnion assembly is mounted. Built by Snyder Tool and Engineering Company of Detroit, this vertical trunnion machine is said to provide for a production of 80 pieces an hour at 75 per cent efficiency.



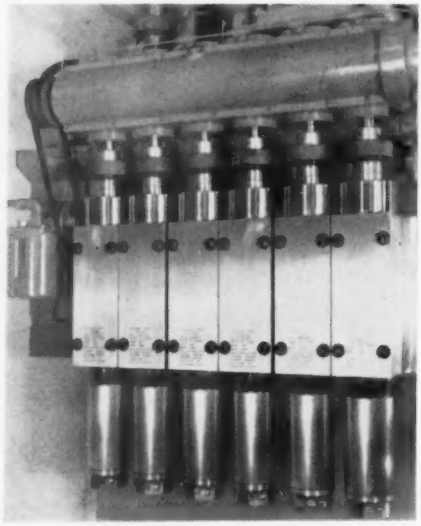
Precision Spindles And Their Application

By JOHN E. HYLER

Covered is a wide variety of precision spindles available for use in surface grinders, boring machines, tool and cutter grinders, internal thread grinders, and other types of equipment, including their operation, construction features, and methods of driving.

WITH the tremendous increase in demands for accuracy in various types of machinery and equipment during the last couple of decades, it has become increasingly apparent that wherever a cutting tool or grinding wheel is carried by a spindle, precision obtained in the work certainly cannot possibly be of any closer order than that maintained in the spindle carrying the tool. In consequence, a great amount of study and research has gone into methods available for the production, application and driving of precision spindles.

Whether such spindles are applied to surface grinders, boring machines, tool and cutter grinders, internal thread grinders, or other types of equipment, high precision is the keynote. Where applied to jig grinders or other equipment intended for producing work of ultra-high precision, still greater care is employed. Even the proposition of



A precision worm drives these six spindles for finish-boring automobile engine cylinders on an Ex-Cell-O machine. There are two tools in each cutting head. One has a small radius to produce a straight, round bore; the other has a large radius to truncate the form left by the first tool and to establish size. Illustration courtesy Ex-Cell-O Corporation.

Sixteen extended body spindles on a double-end Ex-Cell-O precision cylinder boring machine finish-bore all cylinders in two V-8 engine blocks during each machine cycle. Illustration courtesy Ex-Cell-O Corporation.

maintaining uniform temperature in a spindle, whether in operation or not, may be one of the factors involved.

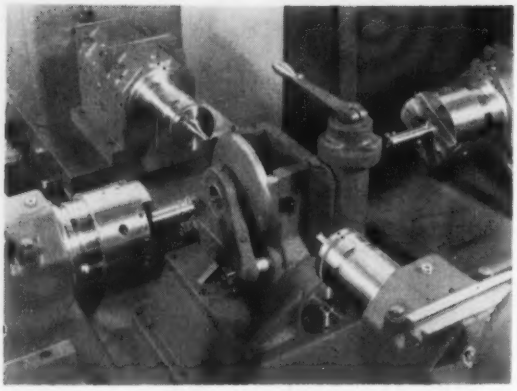
An interesting aspect of the precision-spindle idea is that such spindles may be applied to old as well as new machines. Moreover, it is not at all uncommon for prominent machine tool builders to obtain precision spindles from those who specialize in their manufacture, installing them on new internal grinders, universal grinders, and various other types of machines. One might think of a precision spindle manufacturer as specializing on one design of precision spindle; actually this is seldom the case. Instead, different precision spindle specialists have evolved different ideas, and produce different types of spindles; therefore, a selection is available, enabling specific users to choose a unit which best suits their particular purpose.

Specific Spindles Being Employed

Some standard internal grinding spindles, provided with a mounting bracket, are belt driven and applicable to practically all internal grinders and internal attachments on universal grinders. Some of these spindles are so designed that the pulley for the drive belt extends from one end of a single long bearing. Others are equipped with an exceptionally long bearing, enough of which has been cut away at one side to allow the driving belt to be threaded around a pulley inserted on the spindle in the cutaway portion. This design provides support on both sides of the pulley, which is a definite advantage.

There are certain standard spindles which are air driven at 65,000 r.p.m. Such are meant for producing a fine finish in small holes, where very little stock is to be removed. The air stream acts on an impeller mounted on the spindle, and thereby drives it. The driving air enters from the rear and circulates through the spindle to cool it.

There is one standard spindle, used for internal grinding and various special applications, which has a built-in motor and operates at 25,000 r.p.m. from a frequency changer. This spindle is available mounted in a bracket and may be obtained either with a collet chuck, suitable for holding mounted wheels, or with solid projection or removable quills.



Four Ex-Cell-O precision boring spindles on an Ex-Cell-O four-way machine bore differential cases. Two of the spindles are equipped with cross-feed heads for positioning the tools in back counterboring operations. Illustration courtesy Ex-Cell-O Corporation.

There are other high-frequency spindles which operate at much higher speed. One such spindle has a built-in motor operating at 65,000 r.p.m. on high frequency current. It is used with mounted-point wheels and has been found highly efficient for production grinding small holes. This particular unit is equipped with an oil-mist lubricating and cooling system.

Many Different Grinding Spindles

Precision spindles are available for practically every make of surface grinder, as well as for practically all recognized makes of tool and cutter grinders. There are precision spindle assemblies available for application to universal grinders. A great many precision spindles are permanently lubricated at the factory, so that they can be installed and forgotten about insofar as lubrication is concerned. Precision gear grinder spindles, which operate at 6,000 r.p.m., are available for driving by either flat belt or V-belts.

There are special spindles of extended-sleeve type, which are truly precision units, designed for grinding very deep holes. The projection part of the spindle, which enters the hole, is smaller in diameter than the balance. Usually, this extension is not greater than 14 in., since such a length will take care of most grinding considered to be deep-hole grinding. However, in special cases, spindles of this type have been made with an overall length of 69 in. and a projection of 45 inches.

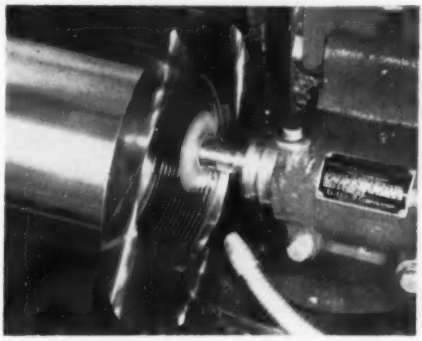
Various spindles are provided for special applications. A case in point is a precision spindle with a built-in motor, running on high-frequency current and operating at 10,000 r.p.m. This particular spindle is used in connection with a carbide cutter for cleaning up slots in electric motor commutator bars. It is completely enclosed and cooled by a fan. This type of work is also performed at times by belt-driven spindles. The spindles mentioned above are only a few of the many obtainable. Those who have not looked into this field particularly have little idea of the breadth of choice available.

Spindles for New Machines

A large number of excellent new machine tools found in the field have been fitted with spindles provided by spindle specialists. There

is, as one case in point, a precision surface grinder which carries a cartridge-type motorized spindle, running on preloaded roller bearings, which has sealed-in lubrication. The spindle is particularly adapted to the service. This only one of countless cases that could be cited.

Spindles which can be depended on for high-production tools used in boring, milling, grinding, drilling, and so on, must have a high degree of both radial and axial rigidity. There can be no internal radial clearances for an oil film. In most



This belt-driven Ex-Cell-O precision spindle is being used to grind internal threads. Illustration courtesy Ex-Cell-O Corporation.

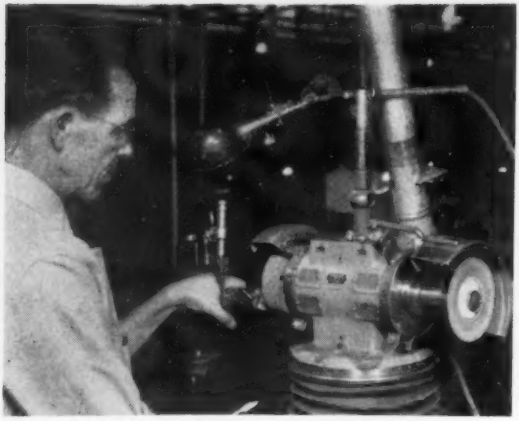
cases there is a carefully determined internal radial preload, which assures accurate centering of the shafts. This, together with the fact that each particular spindle is specifically designed for the job it is intended to do, is the reason such a high degree of precision can be obtained.

Elimination of endwise movement of the shaft is obtained through proper application of thrust bearings. Obviously, experienced manufacturers of such spindles subject them to a dynamic balancing operation. It is known that some spindle manufacturers, in order to remove even the smallest amount of unbalance that may remain, run spindles on their own bearings, with all rotating parts in full assembly, while balancing is in progress. This is important. Different manufacturers of dynamic balancing equipment have pointed out the advantage of balancing any rotating part as it revolves in its own bearings.

Why Balanced in Bearings

The reason why spindles are balanced in their own bearings is that even with the tremendous amount of care exercised by ball bearing manufacturers, and even though high-precision ball bearings approach perfection so closely, they still cannot be regarded as *absolutely* perfect. If a spindle be postulated in which there is an infinitesimal amount of excess weight at one point, and if a ball bearing be placed on that spindle which incorporates an infinitesimal error in one direction, much will depend on the radial relationship of the inner race of that bearing to the spindle on which it is mounted.

Thus, mounted in one position, the particular bearing postulated might *add* its error to the infinitesimal error from balance present in the spindle, so the fault would double up. On the other hand, if the same bearing were removed, turned



A built-in motor Ex-Cell-O precision spindle on a tool and cutter grinder. Illustration courtesy Ex-Cell-O Corporation.

through 180 degrees, and replaced on the same spindle, the errors in the two components, both infinitesimal, might act to practically cancel one another out. From this, the importance of balancing spindles *while* they run on their own bearings, with all rotating parts in full assembly, can be appreciated.

Some builders of high precision spindles also offer a rebuilding service. Where this is the case, their spindles need not be discarded, even after many years of continuous service, but are simply sent to the factory for reconditioning. Obviously, however, where it is determined to rebuild a high precision spindle, only the same craftsmanship that was built into it originally will suffice. These spindles should never be sent anywhere except to the factory which produced them originally.

Spindles for Specific Machines

Certain precision spindles have been specifically developed for improving present surface grinders. These spindles are heavily spring preloaded, to keep them radially and axially rigid, and carry a 3,600 r.p.m. enclosed motor. Sealed lubrication is provided, and the spindle sparks out fast, leaving an excellent finish. This spindle, incidentally, is sufficiently rigid for crush dressing, and therefore can be employed for accurate contour grinding where desired. The spring preloading provided maintains constant adjustment, thereby retaining constant rigidity on the spindle, regardless of wear or changing temperature.

Some manufacturers of precision spindles have found it expedient to provide units for specific types of machines widely used. Thus, an interchangeable spindle has been made available to fit Brown & Sharpe universal grinders. The spindles are mounted in preloaded precision ball bearings, which permit no end shake. Replacement spindles have also been developed for the No. 2 Cincinnati cutter grinder. It is claimed that by the use of these spindles, high quality edges are maintained on carbide tools, and the life of diamond wheels is considerably increased. These spindles feature sealed-in grease lubrication.

Brown & Sharpe No. 13 cutter grinders can also have their spindles replaced with a precision ball bearing assembly. The contained

ball bearings are extremely accurate and preloaded. Application of a highly efficient spindle very often adds life to an old machine, which would otherwise be discarded. There are spring preloaded precision spindles available, which have been specifically designed for use with carbide cutters on 3Z and 3U Gorton and other engraving machines. These spindles will allow a working speed of 25,000 r.p.m., if desired, thus providing for fine cuts and high finishes without the use of special tools. The spring preloading incorporated automatically compensates both for wear and temperature changes, as they occur.

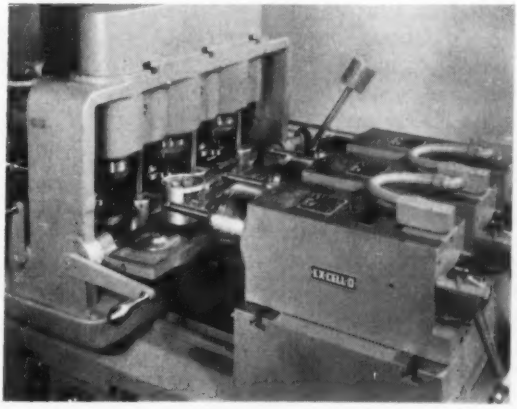
Other Spring Preloaded Spindles

Spring preloading is also employed on high-precision replacement spindles developed for Brown & Sharpe No. 5 surface grinders. These spindles are provided with sealed-in grease lubrication and with highly accurate ball bearings. The original pulley and wheel mount can be used in installing these spindles. Spring preloaded milling spindles are available for carbide tooling. These spindles may be mounted either vertically or horizontally and are said to be excellent for use on Pratt & Whitney duplicators, at 12,000 r.p.m.

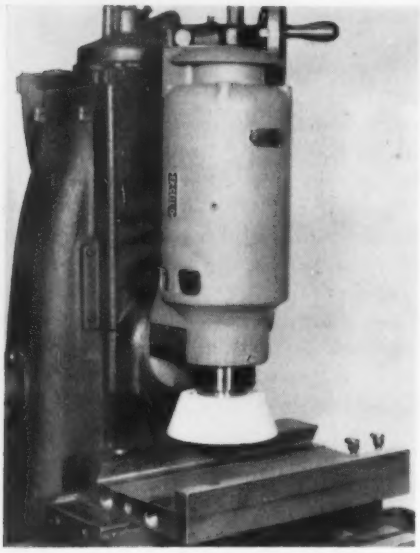
Although so many wonderful developments have been made in high precision spindles by spindle specialists, this is not to say that manufacturers of machines as such have not also had some outstanding developments along this line. At any rate, if some outstanding spindles have been obtained from spindle specialists, machine builders using them have not always publicized the fact. Also, different machine manufacturers have made spindles and incorporated their own drive. This is particularly the case in relationship to air-driven spindles.

Jig Grinding Spindles

The idea of driving precision spindles by means of compressed air was destined to be highly developed, particularly with reference to jig grinding and similar highly-demanding work. One such spindle has been so designed and made that it can be inserted into the jig borer spindle just as one would insert a boring chuck. Thereupon, the jig borer becomes a high speed precision grinder, with a spindle speed controllable between limits of 35,000



Built-in motor spindles are used on this Ex-Cell-O precision boring machine for boring piston-pin holes. Illustration courtesy Ex-Cell-O Corporation.



A special Ex-Cell-O vertical spindle adds flexibility to surface grinder operations. Illustration courtesy Ex-Cell-O Corporation.

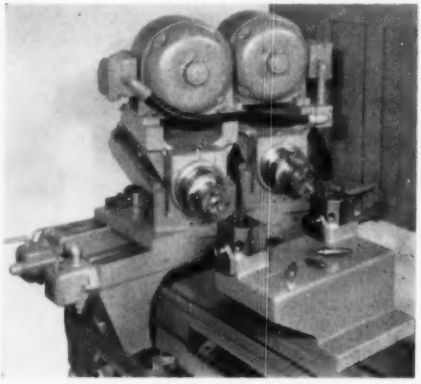
and 65,000 r.p.m. Available with this spindle is a special dust elimination system, which draws off all dust produced, by air vacuum.

The spindle is provided with special adaptors to fit various spindles of given machine tools. For this reason, it can be used with most jig borers, vertical or horizontal milling machines, internal grinders, surface grinders, boring mills or lathes. Using diamond - impregnated studs, holes as small as 1/16 in. in diameter can be precision ground internally. The range of the spindle, using mounted grinding wheels, extends to holes of 1½-in. diameter. A similar spindle is available with which speed is controllable from 10,000 to 18,000 r.p.m. This one can be employed for grinding holes within a range of 1½ to 4 in. in diameter.

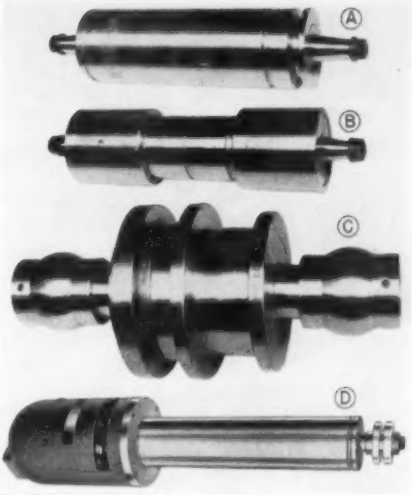
The spindle, being air driven, is cool running. An interesting aspect of such a tool is the ease with which it corrects holes on center distances in hardened tools and other parts.

Applications of Spindles

With this spindle, holes can be ground in hardened steel to "tenths," dowel holes ground square with a preliminarily-ground base, contours and relief formed with tungsten carbide burrs, radii ground in die sections, and contours ground in gages. Various other highly-accurate work may also be performed. In some cases, such a spindle has been built into special machines, developed for performance of highly-accurate and special duty. A case in point is where a business machine manufacturer had such a spindle built into a very small profiling machine, used



These precision spindles on an Ex-Cell-O precision boring machine are set at an angle for taper turning. Air-operated chucks hold the parts on the spindles. Illustration courtesy Ex-Cell-O Corporation.



(A) Double-end replacement spindle of precision type. (B) Precision replacement spindle which can be used in Cincinnati No. 2 cutter grinder and in certain other cutter grinders. (C) Replacement spindle for Brown & Sharpe universal grinders, which contains preloaded precision ball bearings, grease lubricated and sealed at assembly. (D) Surface grinder spindle, often used for improving present surface grinders, which is claimed to be sufficiently rigid for crush dressing and accurate contour grinding. Illustration courtesy The Whitnon Manufacturing Company.

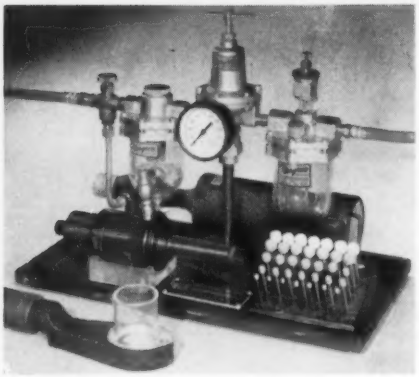
for grinding wearing surfaces of small hardened cams to an extremely fine finish.

Where grinding is performed with diamond-charged studs or mandrels on the type of unit just described, it is recommended that the mandrel be operated between 1,000 and 1,500 surface feet per minute. For all practical purposes, mandrels should work to a depth not exceeding 6 times the diameter of the hole being ground. Thus, a $\frac{1}{8}$-inch diameter hole can be safely ground to a depth of $\frac{3}{4}$ inch. Diamond dust is provided in three grits for the mandrels: 40 to 60 grit for roughing, 60 to 80 grit for finish grinding, and 100 grit for extra fine finish.

The procedure recommended for charging a mandrel is to place a small pinch of diamond dust in a drop of oil, on a hardened block. The oil keeps the dust from flying around. The mandrel is held slightly above the dust and oil, and the mandrel portion to be charged is struck sharp blows with a hardened hammer. Between blows, the mandrel is rotated slightly, in order to get a good distribution of the charge. After a mandrel has been charged, the oil is cleaned off, and loose dust particles are removed with cleaning compound. One then checks with a magnifying glass to see if the charge is evenly distributed. Specific instructions are provided by the manufacturer for procedure in actual grinding with these mandrels. Procedure includes cleaning the hole to be ground with a pipe cleaner, dipped in carbon tetrachloride.

Electrically Heated Spindles

Some leading manufacturers of jig grinders have pointed out the very great importance of accuracy in the spindle of these machines. All the inherent accuracy of a measuring system, capable of positioning a workpiece in relation to the spindle within a "tenth," is practically canceled out if the spindle itself does not retain its position during machining operations. Movement, caused by thermal expansion, is inevitable unless steps are taken during design to minimize or prevent it. For this reason, one particular jig grinder has an electric heating element incorporated in its main spin-



Air-driven high-speed spindle, employed for quickly converting machine tools, such as jig borers or vertical mills, into jig grinders. Shown with the spindle is a set of mounted wheels and related equipment. Furnished with such spindles are an adaptor to fit a specific machine tool; vacuum dust collector for use when grinding holes or dressing grinding wheels; standard filter and oiler that provides clean air; oil mist to preserve bearings at high speeds; 100-lb. pressure gage, which determines the r.p.m. per pound of pressure; and regulator to control speed of the spindle. Holes ranging in diameter from 1/16 to 1½ in. can be precision ground, using diamond impregnated studs or mounted grinding wheels. Illustration courtesy The Vulcan Tool Company.

dle housing to maintain uniform temperature, whether the machine is running or not.

An observation thermometer is located in such a way as to indicate any abnormal temperature change within the housing. The housing itself is cast from 36 per cent nickel iron, which material minimizes the effect of temperature variations. Moreover, a pneumatic head directs air onto the workpiece, to prevent undue rise of temperature either in the workpiece or the locating members of the machine. The point of particular interest here, however, is the care that has been taken to maintain uniform temperature in the spindle and the spindle housing. Were it not for this particular characteristic, there would inevitably be a period of an hour or two during which movement would occur in the spindle—during warm-up after shutdown. The nickel alloy cast iron from which the housing itself is made will expand only 1/5 the amount of ordinary iron.

The main spindle of this machine, however, in connection with which such great care has been taken to ensure absolute accuracy, may be considered as only one part of a composite spindle. In hole grinding by the jig grinder method, which is in a sense similar to single-point boring, the mounted wheel must travel with a planetary motion at relatively slow speed, while it revolves on its axis at very high speed.

Dovetail Slide for Offsetting

In order to accomplish offsetting, a horizontal dovetail slide is attached to the lower end of the main spindle assembly. The grinding head, which contains the high speed, pneumatic - turbine - powered, grinding spindle, is provided with a mating horizontal dovetail at its top end, by means of which it can be laterally adjusted in the dovetail at the lower end of the main spindle. Thus, any desired amount of offset between the axes of the main spindle and the grinding-head spindle can be incorporated for a given setup. The work is located with the center of the desired finished hole in line with the main spindle axis, and the desired radius of hole to be produced is reduced by subtracting the radius of the wheel to be used from

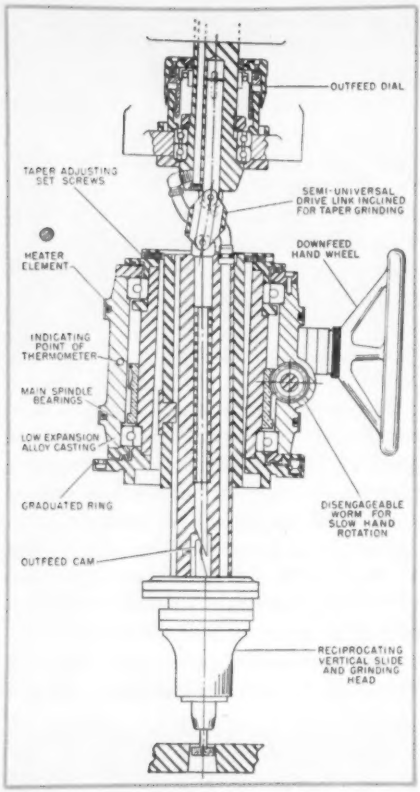
it, to arrive at the amount of offset to be incorporated between the axes of the two spindles.

Any one of three different air-powered grinding heads or spindles may be applied to the main spindle of this jig grinder. These provide for different speed ranges, in keeping with different hole-diameter ranges. The slowest-speed air head furnished may be operated from 12,000 to 15,000 r.p.m., and accommodates wheel diameters of 1½, 2 and 2½ in., grinding holes 2½ to 5 in. in diameter. The intermediate air head provides speeds from 15,000 to 40,000 r.p.m. and makes use of mounted wheels within the diameter range of ¼ to 1½ in., grinding holes from 5/16 to 3½ in. The high speed air head or spindle has adjustable speeds from 35,000 to 60,000 r.p.m. and will accommodate mounted wheels from ⅛ to ¾-in. diameter or diamond-charged mandrels for smaller holes where necessary. This unit will grind holes from 1/64 to ¾ in. in diameter.

Ordinarily, the main spindle is rotated by power, furnishing the required eccentric or planetary action to the air-powered grinding spindle. However, the machine provides facilities for disconnecting the main spindle from the power source, and for cutting into service, instead, a disengageable worm. This worm engages a worm wheel in the main spindle assembly. The forward end of the worm shaft is fitted with a small handwheel, making it possible for the operator to provide slow planetary motion on the grinding spindle by hand. This arrangement allows male and female radii to be ground on internal or external arcs, as the need arises, without the grinder head negotiating an entire circle.

There are yet other aspects to this particular high precision machine spindle layout, in that its control spindle is located above the main spindle of the machine, with its axis normally in line with the axis of the main spindle. Facilities are provided for tilting the main spindle (and the grinding head is automatically tilted with it) for grinding tapered holes. Provision is also made for re-

Special air-driven spindle mounted on a machine spindle for precision-grinding small holes in a hole circle. Such spindles may be used for grinding dowel holes square with a preliminarily-ground base, for moving center locations of holes in hardened steel blocks, for grinding interchangeable holes in hardened sections, for grinding radii in die sections, for grinding contours in gages, for grinding holes from 0.032 to ⅛ in. with diamond-impregnated laps, and for grinding contours and relief with tungsten carbide burrs. Illustration courtesy The Vulcan Tool Company.



Drawing showing reciprocating and rotating parts of special spindle layout on a modern jig grinder, which incorporates a heating element in the spindle housing for maintaining a uniform temperature, in the interest of high accuracy. At the top is seen the small control spindle, connected by a semi-universal drive link to the main spindle assembly. The grinding head, with its spindle, can be seen mounted on a dovetail way to the lower end of the main spindle disc, thus making it possible to offset the grinding head spindle in reference to the main spindle. Moreover, there is provision for tilting the main spindle (it is shown here tilted) for grinding tapered holes. Under this arrangement, the mounted grinding wheel has a planetary motion in addition to its reciprocating movement. This planetary motion is usually derived from the control spindle at the top, which is, in turn, driven by a motor through a flexible shaft. Note the disengageable worm, for slow hand rotation. A small handwheel (which cannot be seen in this drawing) is arranged on the near end of this worm shaft. The power drive from the control spindle above can be disengaged and this worm used for slow hand rotation by means of the handwheel. Conversely, when the control spindle is being used, the worm is disengaged. Drawing courtesy Moore Special Tool Company, Inc.

ciprocating the grinding element in a path parallel to the wall of the hole or other work being ground. Various accessories are provided for use with the machine, which permit many unusual and trick grinding operations to be performed. These accessories, however, are outside the scope of this article, which is limited to discussion of precision spindles.

Belt Driving Precision Spindles

It may be well to mention that in the case of precision spindles driven from an external power source, making it necessary to use a belt, it has long been noted that any substantial amount of weight in a belt impaired efficiency of the drive greatly. High speed precision spindles, where fitted with a pulley, have one of very small radius. Any belt used must be highly flexible, to negotiate this small radius properly. Although V-belts and round belts have been used in some cases, something more nearly approaching the nature of a flat belt is generally found better. It is known that notched or timing belts, so-called, have been used to advantage in some cases. The timing belt drive is capable of high speeds and high ratios, and is light but powerful, doing no slipping.

The endless woven belt has often been found highly efficient where necessary to drive around very small pulleys on high speed spindles. Belts woven endless, from cotton or nylon, are often applied to high speed grinder and lathe applications, high

speed sensitive drilling machines, and so on. One of their great advantages is that, since they are woven absolutely endless, they require no lace. In consequence, they have no heavy spot at any point to impart vibration to a high speed spindle. Some of these belts are now made with reinforced edges, practically equal to a selvedge edge, so that fraying of belt edges can be eliminated.

Various ones have felt that these endless woven belts demonstrate much of their efficiency on small-diameter high speeds pulleys due to the fact that the belt allows passage of air directly through it. Therefore, air cannot be drawn in and trapped between the belt and the pulley face to weaken traction. The argument of belt and pulley windage is an old one. Some have not been inclined to accept the fact that a certain amount of excess air is drawn in by that strand of the belt fast moving toward the small pulley. However, there is little doubt about it to those who are informed.

Direct Powering of Spindles

Where high speed spindles are directly attached to their power source, as in instances where they are directly motorized and driven by means of a frequency changer, or where they are directly driven by an air turbine or similar arrangement, no question of belt application is involved. A wide speed range is available by either method. In some cases, manufacturers have been known to use more than one type of air drive on the same machine, but on different spindles.

Thus, on the jig grinder spindle setup described, where three different spindles are provided for three different speed ranges, the one for the lowest speed range is provided with a vane-type air motor, because such a motor develops power at low speed more effciently. For the higher speed spindles, air turbines are employed.

Jig grinder incorporating the special spindle layout shown in the drawing. Note how the drive is from a motor on the back of the machine, through a flexible shaft at the top, to the control spindle noted in the drawing. Illustration courtesy Moore Special Tool Co., Inc.

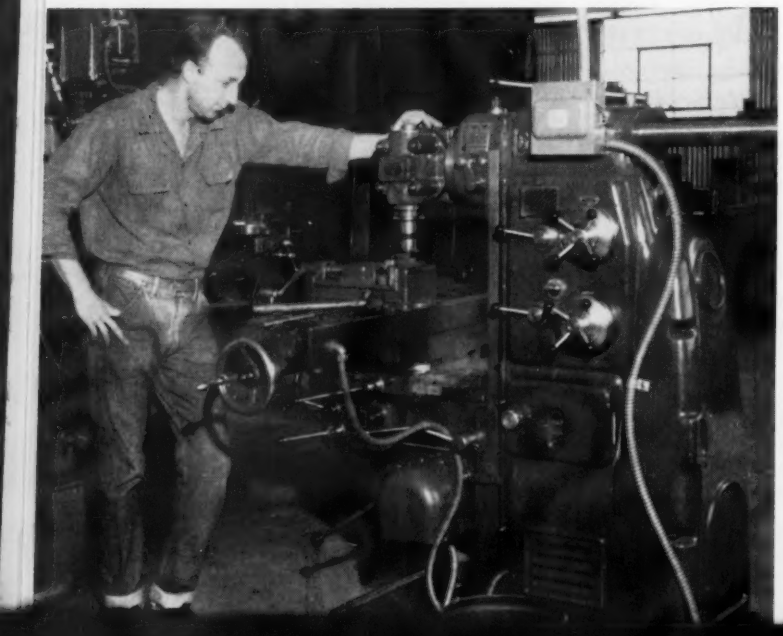
R for High Tool Costs

By Gilbert C. Close

In which the author describes a "temporary tooling" technique for producing stampings to specifications that is designed to reduce tool costs on short-run work.

GIVE any ingenious and mechanical-minded boy a good erector set and he'll put together an endless number of small toy mechanisms, each fabricated from the same limited number of standardized parts. Within the toy-like realm of their application, these toys will be just as serviceable and give just as much pleasure as though each had been constructed of specialized parts specifically fabricated for that particular toy.

Give the Short Run Stamping Company of El Monte, California, an order for 10, 50 or 100 stamped parts, and the company will follow the same technique employed by the boy with the erector set. Standardized and prefabricated die and tool components will be selected from the toolroom. These parts will be assembled together into the tool required to produce the stampings. The parts produced by this tool will be equal in all respects to parts produced by a Class "A"



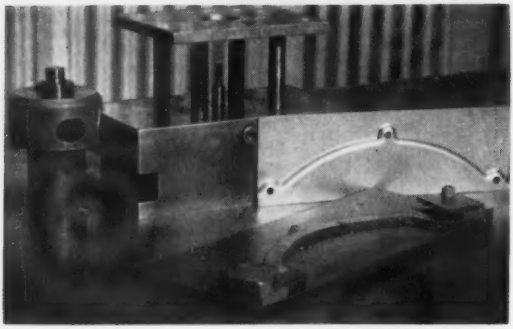
When an order for a short run of stampings is received, the tooling required to fill it can usually be assembled from the standardized tool components already on hand. If one component is needed to complete the tool, it is produced immediately in Short Run Stamping Company's tool and die department. Here a toolmaker mills such a component—the only one necessary to complete the tooling for an order of stampings.

Tool components that have been assembled in various ways to produce more than 3000 different stampings are stored in this small tool bay. Permanent dies for the same number of parts would require the entire shop area for storage space.

permanent die. When the order has been filled, the tool will be disassembled and the components restored for future use.

Now here is the payoff of this situation . . . the cost of the tool to produce this limited run of stampings, as it is put together using prefabricated and standardized tool components, will run between 10 and 35 per cent of what it would cost to produce a permanent tool for the same type and amount of work. It is this tremendous payoff that has skyrocketed Short Run Stamping Company to the largest

After the standard tool and die components are withdrawn from storage for a specific order of stampings, they are delivered to this booth where they are assembled into a completed tool by a trained expert.



Illustrated herewith is a complete piercing die assembled from standard tool components. The part is produces is shown at the right.

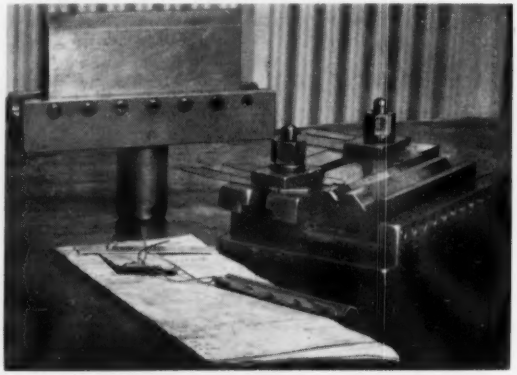
concern of its type in the West Coast area in less than three years of operation.

Engineers have a name for these tools that can be put together at a moment's notice using prefabricated and standardized tool components. They speak of them collectively as "temporary tooling"; however, in this case the word "temporary" does not mean that the tools wear out quickly. It means instead that such tools exist in a certain form only while a specific run of stampings is being produced. Then the tool is disassembled so that its standardized components can be used in putting together other tools.

Stanley Wochnik, Short Run Stamping Company's president, points out that the temporary tooling idea is neither new or revolutionary. "Our great-great grandfathers used the idea long before mass production was heard of," Mr. Wochnik says. "The old hammer and anvil, the forge and the monkey wrench were tools that by slight modifications in use or form could be adapted to various production jobs."

The chief advantage of temporary tooling—lower tool costs—can be realized only when this type of tooling is confined to the work for which it is intended, Mr. Wochnik points out. When a die will be used to produce a million parts, the tool cost per part will be relatively small. However, when only 10, 50 or 1000 parts are to be produced, the tool cost per part, when permanent dies are used, becomes considerably greater.

On the other hand, the lesser degree of mechanization inherent of temporary die and tooling techniques makes for a lower production rate, with a correspondingly higher



A complete forming die assembled from standard tool components. The angled part it produces is shown in the foreground.

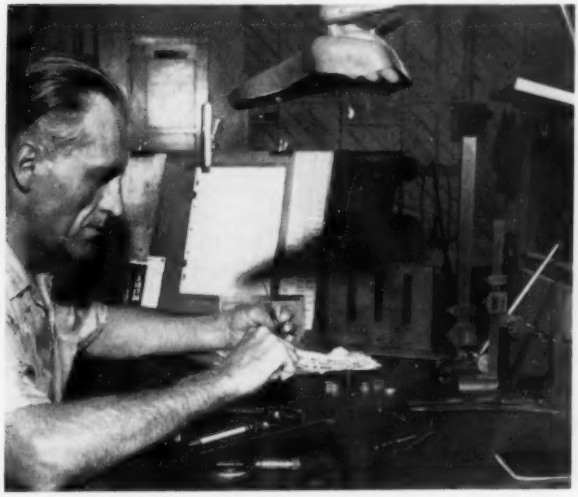
After the tool has been assembled using standardized tool components, the punch press setup is made by an expert who devotes all of his time to setup work.

labor cost per unit. It is thus obvious that temporary tooling should be used only in short-run work where tooling costs overshadow labor costs per unit.

The work at Short Run Stamping Company is largely confined to the production of short-run metal stampings in lots ranging from one to 10,000 parts. Many of these stampings are components for products produced in limited numbers, such as aircraft accessories, electrical recording and controlling instruments, cameras, medical and dental equipment, optical instruments and so on. Single stampings are prototype products or research projects are not uncommon.

"Speed is another important advantage of temporary tooling," Mr. Wochnik says. "It may take anywhere from six weeks to six months to design and produce a set of Class "A" permanent dies. Our average delivery time, for a stamping for which no tool is available when the order is received, is about three weeks. If the customer needs the stampings badly, we can assemble a temporary tool and have them ready for him in 24 hours."

Although temporary tooling exists



After the setup is made, the setup man produces sample parts and delivers them to this inspection booth for an OK on dimensions.

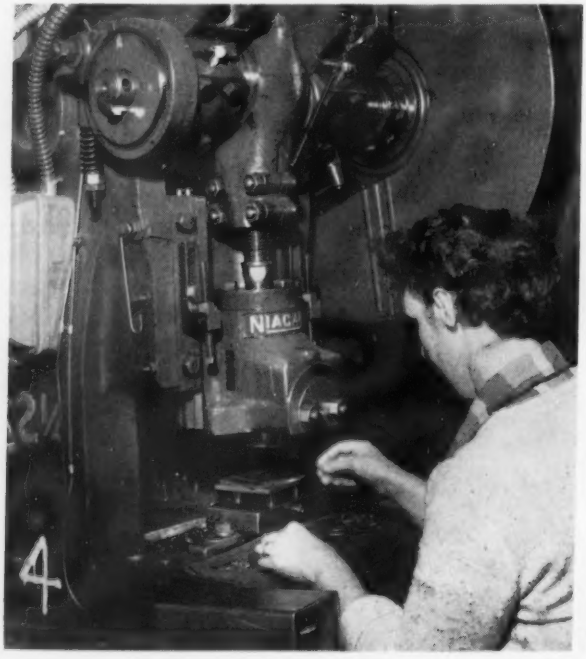
because of its versatility, the use of temporary tools requires a high degree of specialization. At Short Run Tooling Company, all raw material used to make the temporary tool components is of standard thickness and is precut to a standard width and length. This raw material is then racked so that the tool and die makers will have at hand just the right type required for the particular tool component which they are working on at the time.

Line assembly methods are used in tool and die production. One man does all the cutting, another all the filing, a third the machining, and so on. The dies are made of very thin sections of steel, are not mounted, and all punches are "floated." No special machinery aside from conventional toolroom equipment is used at Short Run Stamping Company.

Basically, one idea persists in all facets of tool and die making; this is, the building up of a stock of standard tool and die components which are sufficiently universal in design to permit their use in a wide variety of punch press operations. This reduces to a minimum the necessity for making up individual die or tool components for each job as it comes along.

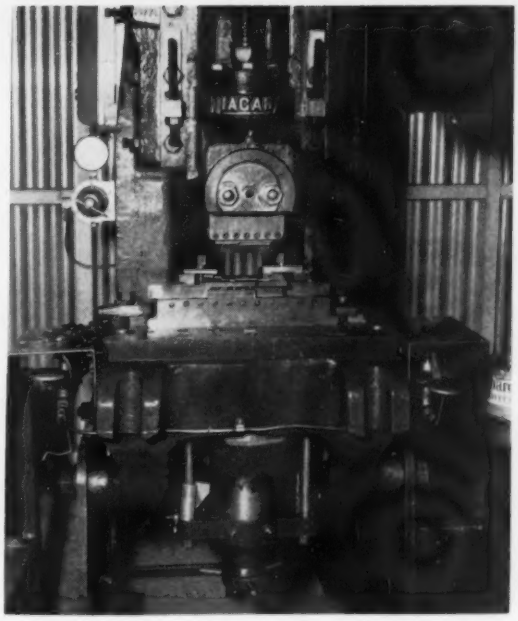
As in tool and die making, production work at Short Run Stamping Company follows a rigid routine. When an order for stampings is received, the tool and die catalog (a record of all tool and die components available) is used to select the tool and die components that will be necessary to make up the final production tool. If a new tool or die component must be made at the time, the order is passed along to the tool and die department.

All tool and die components are then delivered to a tool booth where the completed tool is put to-



Here, after the parts produced by the setup have been OK'd, a production worker turns out the required stampings.

The air cylinder used for air cushion stripping on each punch press is visible just below the punch press table. The control valve is convenient to the operator's left hand.



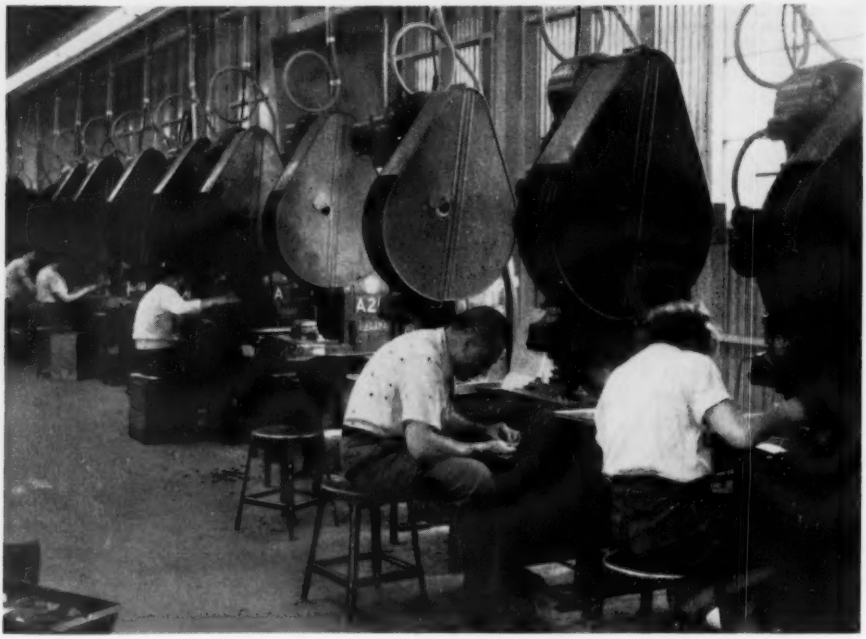
gether by a specialist. This tool is then set up in the punch press by a specialized setup man who does nothing else. The setup man runs a part from the machine and then delivers it to an inspection booth for approval. When this approval is given, an operator is assigned to the machine for production work.

Two standard size piercing dies are used — 3 by 5 and 5 by 7 inches. These dies are provided with standard built-in strippers. All punch presses have been modified by the installation of air cushion stripping mechanisms to do away with the use of springs. Stripping pressures may be quickly and easily modified by merely adjusting a pressure valve.

Die holders are made in standard 1, 2, 3 and 5-in. sizes and can be used with either the blanking, forming or piercing dies. The results of this standardization in tool components are very visible in the Short Run Stamping Company's tool storage department. Here in one small bay all the tools and dies used in producing more than 3,000 different stampings are stored. Mr. Wochnik estimates that if a permanent die had been produced for each stamping, their storage would occupy all the space currently available in the shop.

Stanley Wochnik has this final word of advice: "A lot of people think of a 'temporary tool' as a device which was worked out to produce a limited number of parts and then discarded. This is the wrong view. Our temporary tools will hold the same tolerances produced by a Class "A" permanent die. The various components are used and reused again and again in the make-up of different tools. Many of our dies have produced over 30,000 stampings and are still in good shape.

"A lot of worthwhile projects, now dormant because of estimated tooling costs, would be dusted off and started at once if more people were aware of the temporary tool-

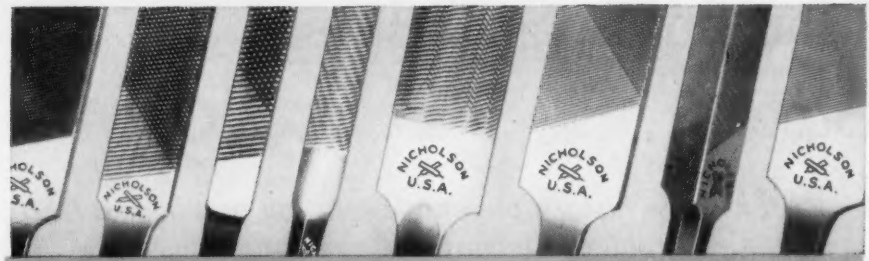


In this illustration, a setup man (second from right) makes a setup, while four production workers turn out stampings on a line of small Niagara punch presses.

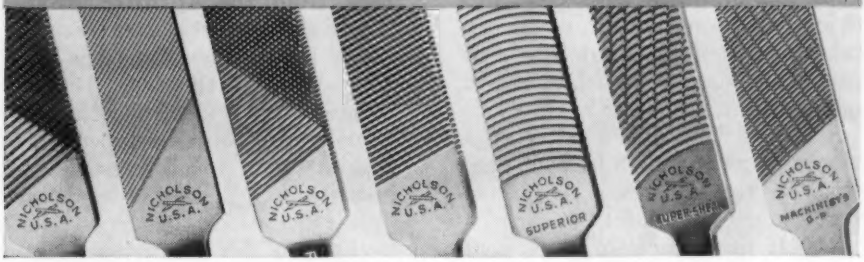
ing shops and the seeming miracles which these particular shops are able to accomplish in the way of reducing tooling costs."

"Speeds and Feeds for Better Turning Results" is the title of a 36-page booklet prepared by The Monarch Machine Co., Sidney, Ohio, for engineers, methods departments and lathe operators as a guide to establishing proper cutting speeds and feeds. Data acquired through the research efforts of the company's own engineers form the basis for the very exhaustive figures which are presented on machinability ratings, tool angles and recommended speeds and feeds for various ferrous and non-ferrous alloys.

Suggestions with respect to coolants are also offered where tool steels, stainless steels and nickel, copper, aluminum and magnesium alloys are concerned. Several pages are devoted to a discussion of what transpires during the metal cutting process — with an accompanying evaluation of the forces acting on a lathe tool under varying conditions of feed and speed. Tables of machinability ratings, speed and feed charts and a number of graphs relating rates of feed to development of tool cutting forces add to the overall usefulness of the manual which, because of its highly technical nature, will be available in limited quantity only. Requests for copies should be made on business letterheads addressed to the company's advertising department.



Wide acceptance proves their merit



Purchasing and production heads like to do business with distributor representatives who have "what it takes." That, first of all, is GOOD PRODUCTS with WIDE ACCEPTANCE.

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Machining Stainless Steel

By G. J. STEVENS*

This case history presents a solution to a poor surface finish problem encountered in boring stainless steel castings on a vertical milling machine.

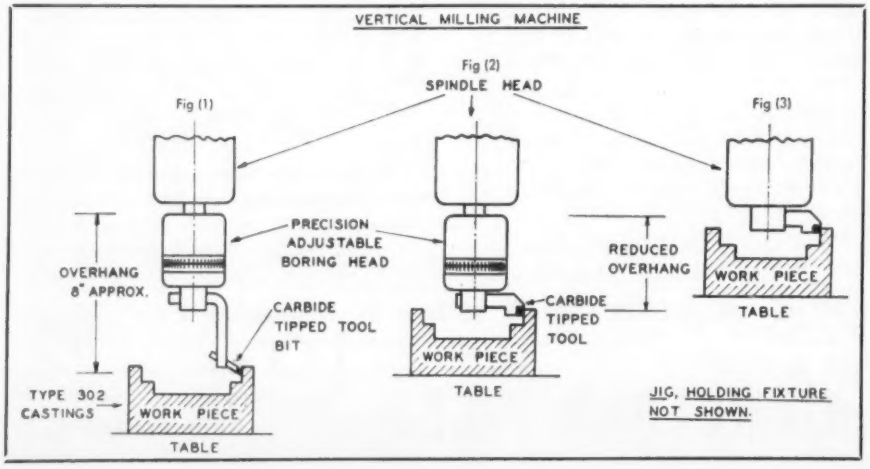
Problem: A poor surface finish resulted from a boring operation being performed on a vertical milling machine. The material consisted of Type 302 stainless steel castings which were bored with a small carbide-tipped tool inserted in a 4-in. long boring bar mounted in a 4-in. long adjustable boring head.

Solution: The machining engineer pointed out the 8-in. over-hang on this setup and made the following recommendations:

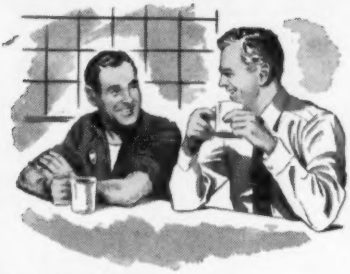
(1) If the volume of work justifies a longer setup time, eliminate the adjustable boring head and bar and replace with a 2-in. o.d. solid bar with but 1½-in. overhang from the spindle head. (Fig. 3 shows most efficient setup.)

(2) If the volume of parts is limited, eliminate the 4-in. boring bar (Fig. 1) and replace with a 1-in. square carbide-tipped tool ground down to fit present adjustable boring head — replacing ¼-in. square carbide-tipped tool. Because of the production situation, this method was adopted immediately with good success.

* Machining Engineer, Armco Steel Corp.

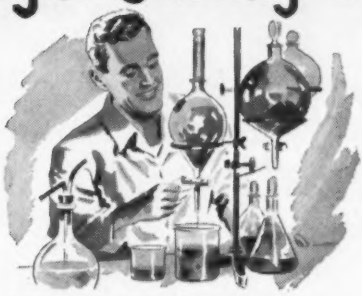


How to Pick the Right Cutting Oil



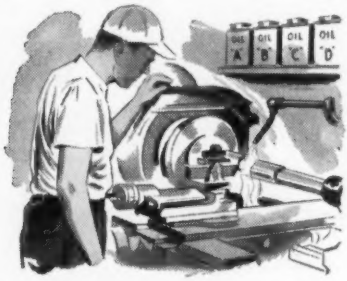
WORD OF MOUTH?

It gives you the answer sometimes, but not many of your friends have the same cutting oil requirements and the same problems that you have. It's much surer to depend on specialists like Sun.



LABORATORY ANALYSIS?

Sure. But there's no formula for correlating the laboratory analysis with how well the cutting oil will work on your job. It takes years of field experience like Sun's to help you make the right choice.



ELABORATE SHOP TEST?

This will probably give you the answer. But it's expensive and interferes with production when you try to test all the oils available. Sun's experience can help keep your shop-testing to a minimum.

EXPERIENCE IS THE ANSWER:

And Sun has it. Its field representatives have probably come across problems similar to yours many times. If they haven't, its cutting oil specialists and metallurgical technicians are ready to help with your problem.

Soluble or straight, transparent or black, light or heavy duty—Sun makes the kind of cutting oil you need to handle your job at the lowest cost. For more information, call your nearest Sun office or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MM-10.

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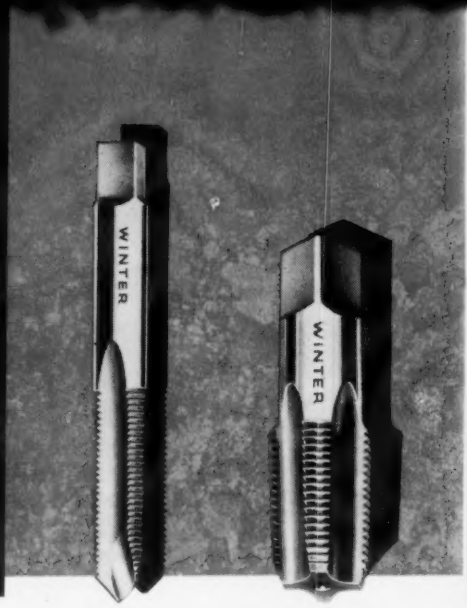

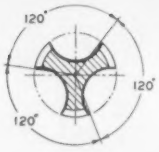

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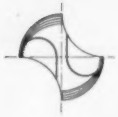
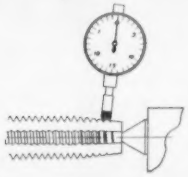


Precision Chip Driver Contours



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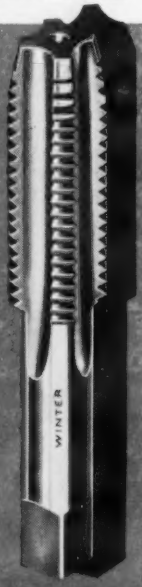

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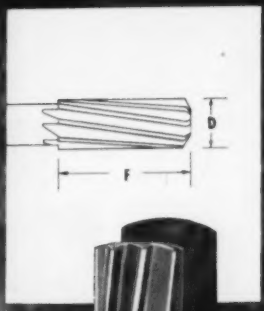

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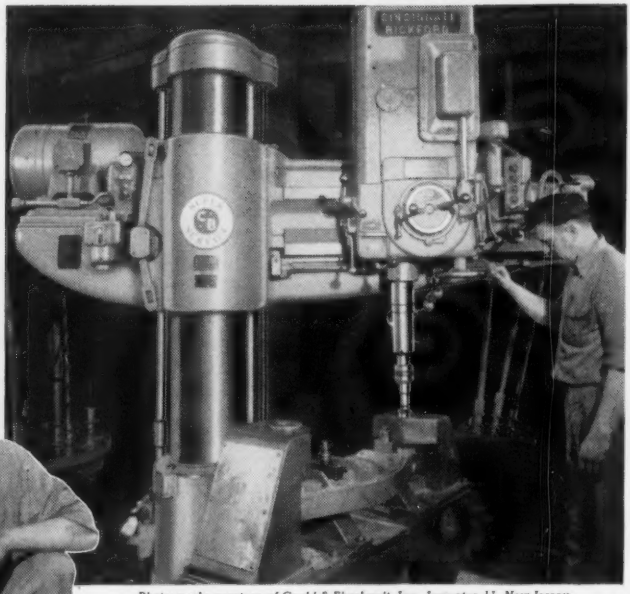

Main lever of 24" Industrial Shaper. Gould & Eberhardt, Inc., Irvington 11, New Jersey.

Photographs courtesy of Gould & Eberhardt, Inc., Irvington 11, New Jersey.

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This exacting job at Gould & Eberhardt, Inc. calls for drilling, boring, reaming and facing one $2\frac{3}{16}$" hole and one $1\frac{11}{16}$" hole. Holes must be parallel with each other and square with the ways within .0015" per foot. Diameters are held to ±.0003". This Cincinnati Bickford Super Service Radial Drill brought improved quality in production.

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$AVING$

Through New Tax Law Depreciation Methods

By H. E. Carroll

A concise report on those measures of the new tax law which most vitally affect purchasers of new equipment.

MOST machine shop executives do not have time to read and to digest the new 875 page tax law. Yet, in these pages are almost 3,000 changes in the old tax law that will have a bearing on our 1954 income tax bill.

One area of vital importance to most machine shops is the change in the depreciation deduction that will reduce your taxable income. These changes make it possible for a machine shop to use any of the following methods for calculating depreciation on its shop equipment or buildings: (1) straight-line method; (2) double declining balance method; (3) sum-of-the-digits method; and (4) any other method of calculating depreciation which does not amount to more write-off at the end of two-thirds of the estimated life of the machinery or buildings than if the double declining balance method of calculating depreciation was employed.

Which Method Is Best?

The fourth provision of the new tax law limits the area that can be covered with its limiting factor of two-thirds. Thus, the other three methods will be selected almost universally this year by modern machine shop executives to figure depreciation for income tax deductions.

All of these three methods have definite advantages and disadvantages. It depends on the age of your equipment, on the policy you have on the replacement of your old equipment, and on the application of these new tax laws to your present accounting system.

The straight-line method of calculating your depreciation is the standard used in former years. This method reduces the value of your machine shop equipment and buildings a certain portion each year. The amount of depreciation charged off each year on an automatic drill,

for instance, is the same; it does not change as long as your machine shop owns the drill.

Only New Equipment Eligible

You can apply the new double declining balance or the sum-of-the-digits methods *only* on new machine shop equipment and buildings. The tax law interpretation of "new" equipment is unused equipment and new buildings purchased after December 31, 1953.

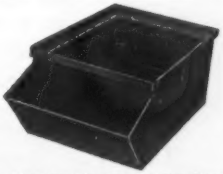
Second-hand or used machine shop machinery does not qualify for calculation with either of these two new methods of figuring your depreciation. Equipment and buildings you owned prior to December 31, 1953, must be depreciated on the old straight-line method until the equipment is replaced with more modern machinery.

Double Declining Balance Method

You determine the double declining balance rate by first determining the useful life of the machine shop equipment. For instance, a punching machine has an estimated life of 25 years. Thus, of the original cost of the punching machine, 4 per cent is charged off each year with the old straight-line method of figuring depreciation. You double this figure of 4 per cent for the double declining balance method of calculating depreciation and use 8 per cent as the base.

To illustrate, a punching machine that costs $2,000 and has a twenty-five year life would be depreciated

"Stack Up"



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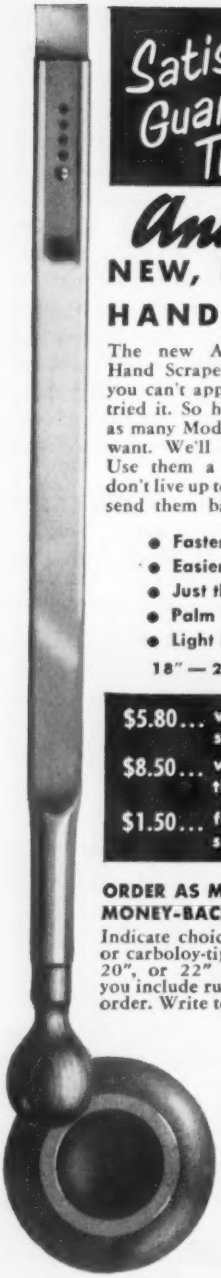

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8 per cent the first year or $160. The second year you would again use the 8 per cent figure, but on the remaining balance of the cost, $1,840, for a second-year depreciation of $147.20.

By using this system a machine shop *never* completely writes off the cost of the equipment. Even if the machine shop equipment is kept in operation beyond its estimated life, the full cost is never completely written off the books.

This method of figuring your shop's depreciation is dangerous for several reasons, as follows:

1. A high rate of depreciation is taken in the early years the machine shop equipment is used and, if a cost accounting system is employed to figure costs, the results will be misleading.
2. The equipment never is completely written off the books and there may be a tendency to keep some machine shop equipment in operation far beyond its economical production life.
3. In the later years of the equipment's life when tax easement may be needed, the depreciation rate is lower than with either the straight-line or the sum-of-the-digits methods.

Sum-of-the-Digits Method

At first glance this method seems more complicated and for that reason may not be adopted. The rate is a fraction rather than a percentage figure and is not quite as easy to calculate; but there are tax dollar benefits that should be carefully considered before it is discarded.

The numerator of the fraction is the remaining useful life of the machine shop equipment. For instance, if an automatic lathe has a 25-year estimated life remaining, the numerator of the fraction is 25. This figure declines one each year that this method is used to determine your depreciation deduction for income tax purposes.

The denominator of the fraction is the sum of the years of the estimated life of the machine shop equipment when first purchased new. For instance, an acetylene generator tank has an estimated life of 10 years. The denominator is determined by adding 1 plus 2 plus 3 plus 4 plus 5 and so on, up to 10 for a total of 55. Thus, the depreciation of the acetylene generator tank would be 10/55ths the first year, 9/55ths the second year, 8/55ths the third year, and so on, until the tank is completely written off the machine shop's books.

The sum-of-the-digits method provides several advantages for a machine shop executive. For instance, on a $5,000 investment in new shop machinery with a five-year estimated useful life, the table of depreciation provided herewith will give you graphic evidence of the savings possible under each of the three approved plans.

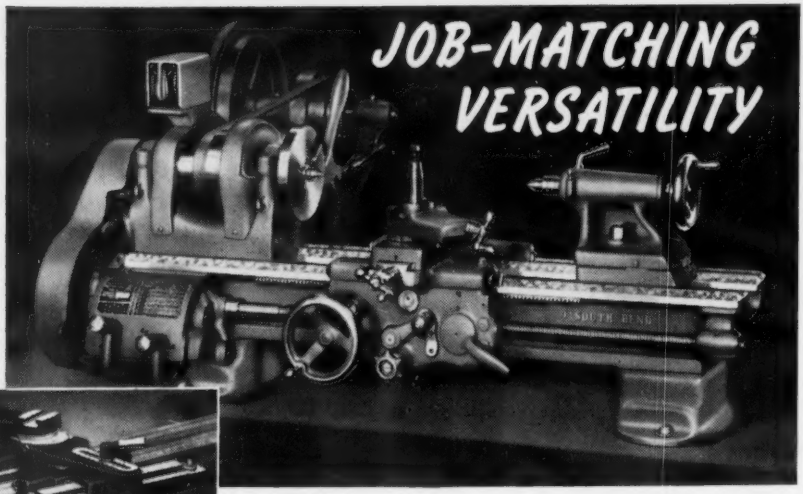
Both the straight-line and the sum-of-the-digits methods completely write off the $5,000 original purchase cost in the five-year span. With the declining balance method there is still a value on the books at the end of the five years, and the machine shop's tax deduction over the five-year period is short this amount.

Table of Depreciation, Showing the Savings Possible under Each of the Three Approved Plans

	STRAIGHT-LINE	DECLINING BALANCE	SUM-OF-THE-DIGITS
1st year	$1,000	$2,000	$1,667
2nd year	$1,000	$1,200	$1,333
3rd year	$1,000	$ 720	$1,000
4th year	$1,000	$ 432	$ 667
5th year	$1,000	$ 259	$ 333

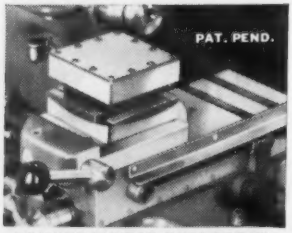
At the end of the third year the total depreciation deduction is the greatest with the sum-of-the-digits method. This is again true at the end of the four year. Your deductions are greater every year except the first and the last years with this system, and even in those years the difference is not too great.

Then, too, with a small depreciation allowance taken in the last year of the useful life of the machinery there is a signal to buy new machine shop equipment for your shop. This guide to better machine shop management will combine good management practice with sound accounting principles and, in addition, will save you money on your income tax.



TAPER ATTACHMENT

HANDLEVER BED TURRET



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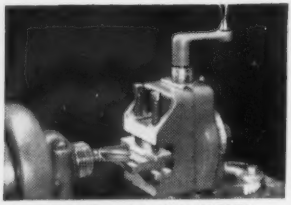

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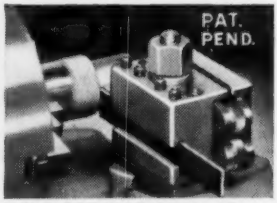

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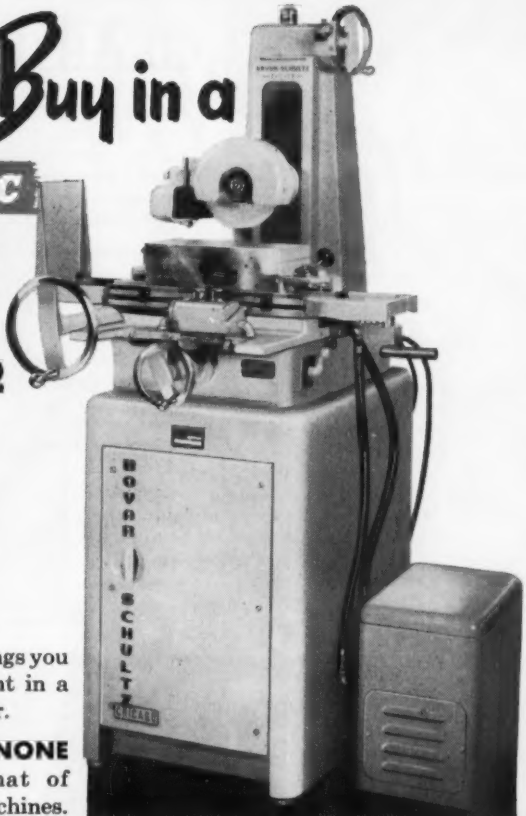

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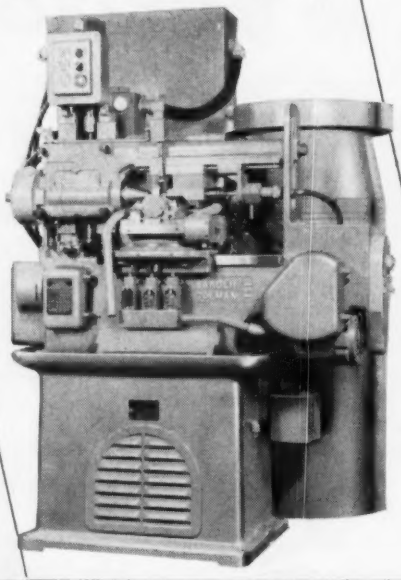
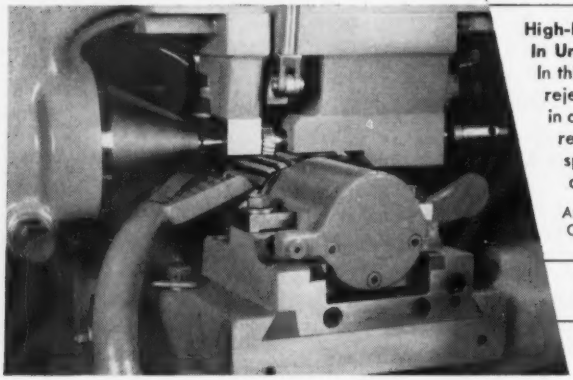
offers new low costs on gears 16 pitch or finer

As more and more gear operations are modernized to place them on a competitive basis, automatic gear hobbing equipment becomes an essential approach in reducing gear costs. Since 1937 Barber-Colman engineers have been working closely with major gear producers in the application of automatic gear hobbing. At first, automatic hobbing applications were made in the watch gear and instrument fields. Later, machines were built for medium pitches in other fields, such as fishing reel gears. Now this latest Automatic No. 6-10 Hobbing Machine is designed specially for cutting automatic transmission and speedometer gears to meet the required rate of production on an automatic production line.





High-Production Plant Reports Savings In Unit-Costs with Fewer Gear Rejects

In this particular production plant, fewer gear rejects are occurring. An overall reduction in cost per gear has been effected through reduced man-hours and continuous high-speed output. One of a of battery machines performs as follows:

Automatic Cycle —	356 Hob RPM, 175 Hob SFM. .050" feed per rev., 60-second complete cycle time.
Transmission Gear —	16 teeth, 18° 30' helix angle 18 DP., SAE 1330, .937" OD. x ⅜".
Class C Accurate Unground Hob	1⅞" dia. x 3" face x ¾" bore, 3 threads, unground, pre-shave.

Blanks are automatically loaded through a hopper-feed system and positively located and clamped hydraulically on a solid arbor in cutting position. The cycle sequence includes rapid traverse to the hobbing position, lowering of the work slide to cutting depth, hobbing the blank, raising the work slide, rapid traverse to the right, and unload. A new blank then is automatically presented for hobbing and the cycle repeated continuously until the machine is shut off. Machine features include automatic hob shifting for greater tool life and metered hydraulic pressure for positive arbor mounting and ejection. Rapid traverse is actuated electrically, and the work slide is hydraulically actuated.

B U I L D E R S O F P R E C I S I O N G E A R

Adaptable to Wide Range of Long-Run, High Speed Gear Production.

This type of cycle arrangement is adaptable to many similar long-run gear cutting operations within the general range of 16 pitch and finer, depending upon the particular gear specifications. The cycle is arranged to suit the requirements of the job, and tooling, feed, speed and cycle-timing will depend upon the required production and gear specifications.

Positive Control Over Gear Accuracy Through Automatic Arbor Loading.

Barber-Colman automatic hobbing supplies positive gear accuracy control through specially developed tooling which mechanically mounts blanks solidly upon the work arbor prior to cutting. This arrangement eliminates chances for looseness, runout or vibration likely to occur in other types of mounting. Work arbors are designed for positive pick-up and location of the blank.

Cycle Fully Protected by Automatic Stops.

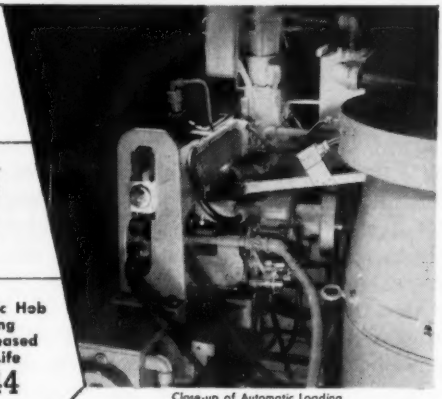
A combination of electric limit switches, program motor and mechanical movements governs the cycle. Faulty blanks are automatically rejected if presented for hobbing, and the machine is under complete control at all times.

Rear View Showing Automatic Loader and Electrical Panel

First Automatic Cycle Hobbing Machine 1936

First Fully Automatic Hobbing Machine 1937

Automatic Hob Shifting for Increased Tool Life 1944



Close-up of Automatic Loading

Engineering Service Available Without Obligation

Check your high production gear operations to determine whether you are maintaining a competitive cost basis. Barber-Colman engineers will gladly consult with your gear production people to demonstrate the cost-saving benefits of automatic hobbing. Ask your Barber-Colman representative to arrange an appointment for you, or write directly to Automatic Hobbing Engineering. No obligation!

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BARBER COLMAN

Barber-Colman Company

GENERAL OFFICES AND PLANT, 6510 ROCK STREET, ROCKFORD, ILL.

HOBS AND MACHINES SINCE 1911

How to Assure Quality Production through Tool And Gage Control

By THOMAS J. BIZZOCO

The purpose of this article is to discuss a virtually foolproof system for tool, instrument and gage control, featuring economy and practicability of operation.

THE integration of an efficient plant depends on how well it is related to dependable tooling, sound production planning, interdepartmental coordination, measurement control, inventory control, effective purchasing and tool, instrument and gage controls; when combined, these controls spell customer satisfaction.

The purpose of this article is to discuss a method nearest to a foolproof system for tool, instrument and gage control, featuring economy and practicability of operation. Practically every industrial plant has some sort of control over these items, the adequate function of which is, in many cases, neglected, costing several thousands of dollars yearly in delayed production schedules, man-hours, rejected work, poor assembling of component parts, lost and/or damaged items and, most important, poor product performance in the field.

We must bear in mind that the successful operation of a tool, instrument and gage control system is dependent upon the attitude top management takes toward this group. In view of the service this department is to render to all other departments, it requires large space, expensive measuring instruments, integral support, and a certain amount of procedural authority, in order to obtain the ultimate in effective tool, instrument and gage inventory control, fixed responsibility of control, knowledge of item location at all times, inspection procedure, proper allocation of tools, instruments and gages, elimination of shortages, and closer record controls.

Tools, gages and/or instruments whether purchased from an outside vendor or made in your own shop should never be permitted to be put into use unless they are first inspected, numbered, cardexed, cataloged and approved for use by the Tool, Gage and Instrument Control Department. This department should be centrally related to all

other departments it has to service. In planning its location we should consider the fact that the locale must be air-conditioned and enclosed to make it free of dust and other impurities found in the air of a machine shop.

Tools, instruments and gages stored in this area should be protected by special cabinets that will shelter them from possible corrosion. Cleanliness is of utmost importance in this department and should be made a rule for all those engaged in the servicing, inspecting or handling of instruments, tools or gages; size blocks or any other standards should never be touched with soiled hands. Temperature should be maintained at 68 deg. F. and kept there even when the facilities remain inoperative for several days. We all know that a long period of time is required before all tools, instruments and gages will normalize.

All measuring instruments, size blocks and standards should be laid out in such a way as to prevent size changes resulting from the influence of sun rays, air ducts, steam pipes and drafts. All tools, dies, measuring instruments, gages, jigs, fixtures, hobs, taps, forming tools, special taps, inspection fixtures and so on should be kept under constant surveillance by the Tool, Instrument and Gage Department.

A log, such as shown in Fig. 1, should be kept for all items received

TOOL, INSTRUMENT AND GAGE LOG BOOK 1 **PAGE NO. 1**

ITEM NAME OR DESCRIPTION	LOG NO. 1	SERIAL NO. D.J. 101
Drill Jig		
PURCHASE ORDER NO.	**ORDERED BY MR.**	**DEPT. NO.**
S - 122507	W. Hansen	245 Drill Press
INSPECTED BY	**DATE RECEIVED**	**PART NO.** 27906-3
J. McAllearney	1/29/54	**JOB NO.** ST. 12
DELIVERED TO DEPT. NO.	**RECEIVED BY**	**TOOL NO.** T-3201
245 Drill Press	W. Hansen	**SKETCH NO.** S-3201B

TRANSFERRED	FROM DEPT. NO.	TO DEPT. NO.	DATE

MANUFACTURED BY	ADDRESS	PRICE
Apex Die Corp.	Brooklyn, N. Y.	$516.00

WHEN REJECTED PLEASE ENTER REASONS.

Fig. 1—A log, such as shown herewith, should be kept by the Tool, Instrument and Gage Department of all items received to facilitate locating them and as a general reference to other departments.

in order to facilitate locating them and as a general reference to other departments. After entering all the required information in the log book, the inspector delivers the item to the designated place. He fills out a file card, as illustrated in Fig. 2, showing date of delivery and other information and a functional card, as shown in Fig. 3, which is filed in the crib or store where the tool is located. By functional file card we mean a life card which will stay with the object at all times, recording its progress and which shall cease to exist when the tool or gage is no longer in use.

UTOPIA MACHINE COMPANY, NEW YORK, N. Y.
TOOL, INSTRUMENT AND GAGE DEPARTMENT

COLOR CODE	Blue	**FILE NO.**	1	**CLASS**	Standard
ITEM, NAME OR DESCRIPTION				**SKETCH NO.**	S-3201B
				TOOL NO.	T-3201
DRILL JIG				**SERIAL NO.**	D.J. 101
DATE DELIVERED		**DEPT. NO.**		**CRIB NO.**	
3/29/54		245		3	
LOG BOOK NO.	**PAGE NO.**	**ACCEPTED BY MR.**		**DATE**	
1	1	J. McAllearney		3/29/54	
DEPT. FOREMAN SIGNATURE REQUIRED UPON DELIVERY					
Walter Hansen					

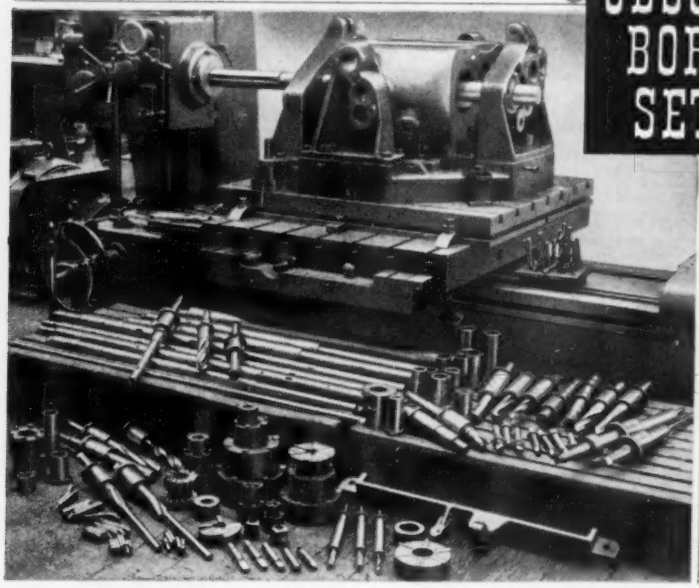
Fig. 2—After entering all the necessary data in the log book, the inspector delivers the tool to the designated area, filling out a file card, as shown herewith, on which he lists date of delivery and other information.

All items should be classified as per color code in order to establish the time frequency for reinspection, as shown in Fig. 4. The time element will be governed by the frequency use of the item; e.g., a plug gage should never be allowed to be used more than once on each shift. This can be controlled simply by instructing the tool crib attendant that when a gage is returned, it is not to be reissued without first being inspected.

In order to establish a definite system, the tool crib is supplied with three file card cabinets which are labeled Instruments, Gages and Tools. The cards list all items carried by the tool crib. The mechanics of this system works somewhat as follows: An operator comes to the tool crib window and asks for a certain drill jig, calling out to the tool crib attendant the sketch number, tool number or serial number as appearing on the operation sheet or blueprint. The attendant opens the file cabinet and pulls out the card shown in Fig. 3 on which he notes the exact location of the jig; he receives a tool check from the operator which he clips to the card, placing it in the out file—a rack type holding device similar to a time card rack, as shown in Fig. 5. After

Here is a picture of an...

OBSOLETE BORING SETUP!

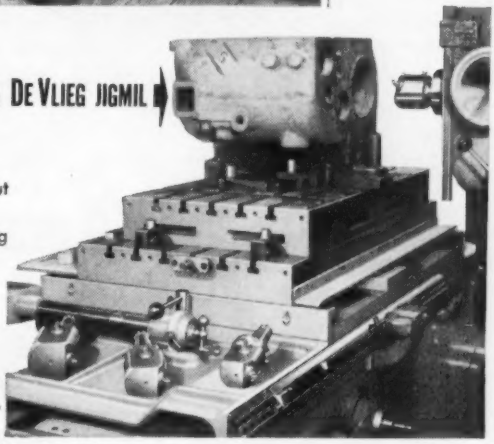


THIS PICTURE— taken in a well known machine tool plant illustrates the old method of boring turret lathe headstocks with a costly inflexible box jig and a mass of special tooling

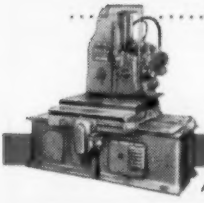
The Modern Method

"JIGLESS BORING" THE SAME PIECE ON A DE VLIEG JIGMIL

- Eliminated expensive boring jig
- Reduced machining time
- Improved accuracy with a resultant cut in assembly costs
- Permitted the use of simplified tooling



If your shop is burdened with costly boring jigs and special tooling, it will pay you to investigate the DE VLIEG SPIRAMATIC JIGMIL!



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UTOPIA MACHINE COMPANY, NEW YORK, N. Y.
TOOL, INSTRUMENT AND GAGE DEPARTMENT

NAME					
	TOOL	Drill Jig			
	INSTRUMENT				
	GAGE				
SKETCH NO.	S-3201B	LOG BOOK NO. 1	PAGE NO. 1	DATE 3/27/54	
SERIAL NO.	D. J. 101	PART NO. 279063	REVISION NO.		
TOOL NO.	T-3201	COLOR CODE Blue	SHELF NO. 3	BIN NO. 5	

REINSPECTION DATE	INSPECTOR'S NAME	REMARKS
4/27/54		

Please note: Enter shelf and bin Nos. in pencil

Fig. 3—In addition to a file card, the inspector also fills out a functional card, as shown herewith, which is filed in the crib where the tool is to be located.

the jig is issued to the operator, the cycle is not completed until the jig is returned, at which time the attendant places the drill jig and file card in the box at the bottom of file rack shown in Fig. 5 for later pick-up by the tool and gage inspector in charge of that area. The time consumed by the issuance and return is about 25 seconds.

The tool and gage inspector assigned to the area picks up the drill jig and file card and, after inspecting the jig, he enters his findings on the file card (Fig. 3), returns the jig in its resting place as shown on the card and refiles the functional card in its proper filing cabinet.

The inspection of the drill jig is visual or, if the time cycle requires, the jig is dimensionally checked. The findings are entered on the functional card. However, should the item prove to be defective in

Fig. 4—All tools should be classified as per color code in order to establish the time frequency for reinspection, as shown on this card.

ITEM NAME	RATE OF CHECK	COLOR CODE
Primary Gages	Weekly or as required	GREEN
Primary Measuring Instruments	" " " "	
Jigs, Dies	Monthly or when repaired	BLUE
Form Tools	" " " "	
Taps, Fixtures	" " " "	
All Other Items	Tri-monthly	BROWN

EACH MACHINIST BECOMES A

5346

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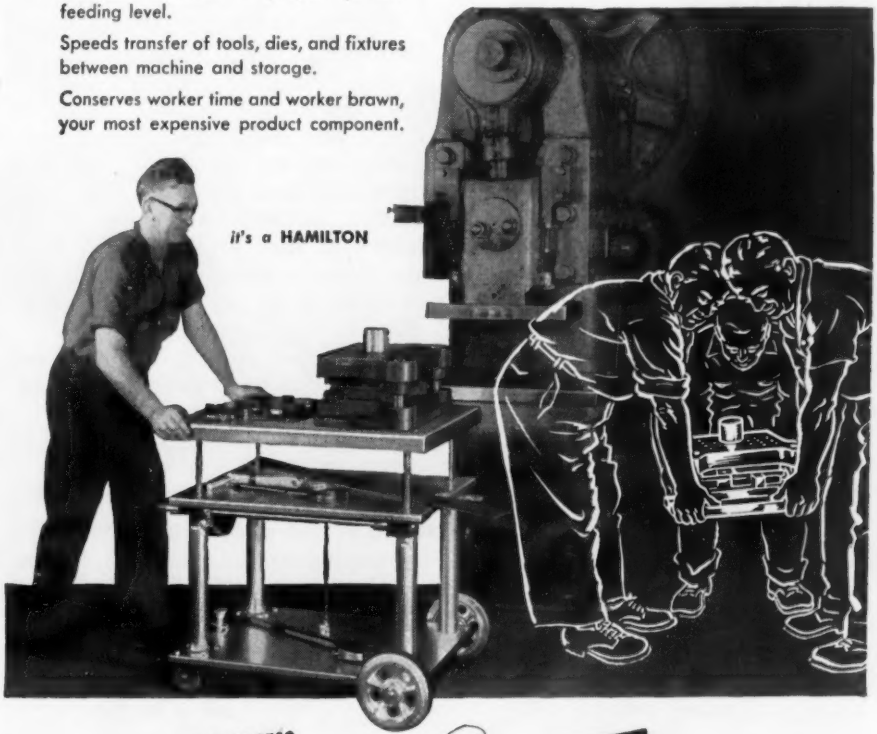
Conserves worker time and worker brawn, your most expensive product component.

Reduces injuries to workmen, and damage to tools and materials due to manual handling.

Provides a portable work bench when and where required.



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Address The Hamilton Tool Company,
828 South Ninth Street, Hamilton, Ohio

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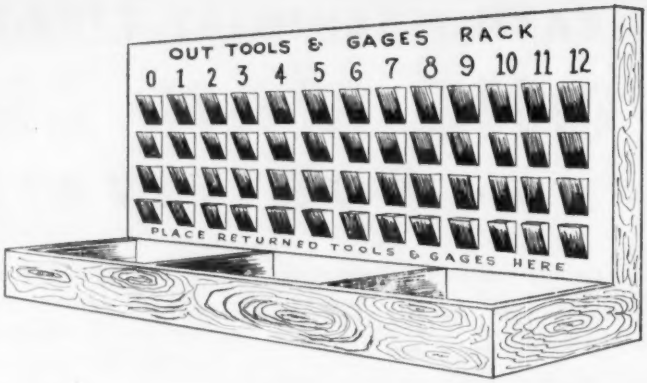

Fig. 5 — Functional cards for tools and gages issued by the tool crib attendant are removed from file and placed in a rack of the type shown, along with tool checks received from operators. When tools are returned, they are placed, together with their file cards, in the compartments at the bottom of the rack.

any way, the inspector removes the jig and its file card, placing in the files a repair card, as shown in Fig. 6, which states the reasons why the item was removed and other information. When the item is returned, the repair card is removed and the original card is put back in its place. If the tool is rejected because it is beyond repair, a report, as shown in Fig. 7, is made out in triplicate. Copies are distributed to respective departments; e.g., Tool, Instrument and Gage, Production Control, and other departments.

The Tool, Instrument and Gage Department upon receipt of the rejection notice immediately locates the item in the log book shown in Fig. 1, and makes the necessary entries from the log book. This department, upon obtaining the information, notifies the person or department that originally ordered the item to ascertain whether this item is to be replaced or discontinued.

Oftentimes a tool is inspected and found to be defective by the in-

Fig. 6—Should a tool prove to be defective in any way, the inspector removes the tool and its file card, placing in the file a repair card, as shown herewith, which states the reasons why the item was removed, as well as other information.

UTOPIA MACHINE CO.—TOOL, INSTRUMENT AND GAGE DEPARTMENT

ITEM NAME	Drill Jig		**Serial No.** D.J. 101
REMOVED BY		**Shelf No.** 3	**Tool No.** T-3201
NAME	J. McAllearney	**Bin No.** 5	**Sketch No.** S-3201B
	REASON FOR REMOVAL		**Taken to Tool Room No.**
	Rear latch broken. Bellmouthed bushing.		
	Broken locating pin.		**Sent to Man'frer** Apex Die Corp. 720—30 St., Bklyn, N. Y.
			Date
			Expected back 4/27/54
Refer to Log No. 1		**Page No.** 1	

5407

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VARIABLE SPEED • SMALL HOLE
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to drill holes (.004" to 5/16") in all drillable materials, to the most exacting specifications and on the most relentless production schedules.

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spector. Upon notifying the department foreman, he is informed that the item is to be used as is and this will cause unnecessary delays. Therefore, in order to avoid misunderstandings, the inspector fills out a card, as shown in Fig. 8, and attaches same to the tool. This information causes the foreman to double check on his data regarding

UTOPIA MACHINE CO.—TOOL, INSTRUMENT AND GAGE DEPARTMENT
REJECTION NOTICE

Item Name	Drill Jig	**Serial No.**	D.J. 101
		Tool No.	T-3201
Job No.	A.S. 3572	**Sketch No.**	S-3201B

REASON FOR REJECTION

Rear latch broken beyond repair. Loose-fitting bushing. Locating stop worn. Base out of square to bushings.

Was used for Part No.	A 729537	**Original Cost**	$516.00
Revision No.	None		
Made by	Apex Die Corp.	**Purchased From**	Apex Die Corp.
Refer to Log No.	1	**Page No.**	1
Inspector's Name:	J. McAllearney	**Foreman's Name:**	W. Hansen

Fig. 7—If a tool is rejected because it is beyond repair, a report, such as shown herewith, is made out in triplicate, with copies distributed to respective departments.

the usability of the tool in question, thereby eliminating the possibility of making a usable but poor quality part. The information gathered by the inspector is entered in the log book and on the functional file card.

Another problem in many shops is the moving of tools, instruments and gages. It is important that the location of any manufacturing tool, measuring instrument or gage be known at all times. Referring to Fig. 9, a transfer notice, in duplicate, if faithfully used by the Tool Control Department will prevent many tools from gathering dust on some shelf while a shortage may exist in another department. If a tool is moved its transfer should be known in order that its inspection cycle is maintained; therefore, after filling out the required information on the card, a copy is sent to the Central Tool, Instrument and Gage Control Department. Upon receiving the transfer notice, Central Control will enter in the log book the new location of the tool. After removing the tool and preparing it for shipment to its new destination, the area inspector takes from the file the tool's functional card, enters on it the tool's condition, erases the data regarding the original location (shelf or bin number) and then replaces the transfer card in the file.

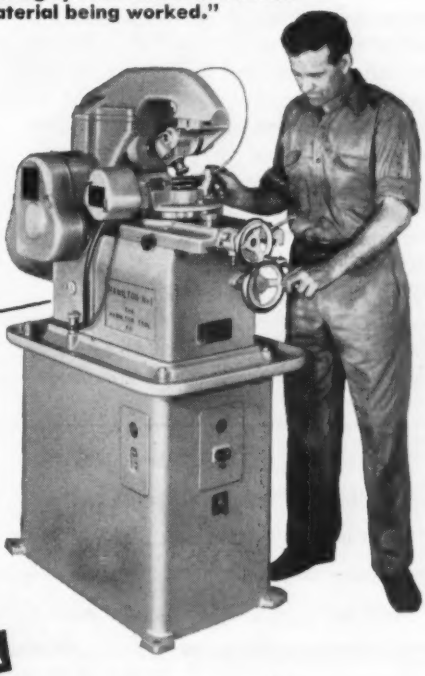
Central Control notifies Production Control of all new items received, inventory changes due to rejection of gages, tools and instru-

5409

SHORT RUNS of PRECISION GEARS

Short runs of small, fine pitch, precision gears (gears up to 6" O.D. of the gear blank) carry high unit costs largely because of the top-heavy machine set-up time as compared to total production time. You can beat the machine set-up problem by routing small precision gear jobs to Hamilton Precision Gear Hobbers . . . for:

"Hamilton Precision Gear Hobbers feature independent selection of speed, feed, and indexing; reducing machine set-up time and offering a selection of cutting speeds and feeds to suit (exactly) the material being worked."



if you buy small quantities of precision gears, tell the man to "put your job on a Hamilton." You stand to profit two ways!

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Hamilton, Ohio

IT'S A **Hamilton Tool**

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Fig. 8—When a tool is found defective by an inspector, he fills out a card, such as shown herewith, and attaches it to the tool.

Item Name Drill Jig
Date Insp. 4/24/54
Rejection Data
250 hole is .010 out of relation to .500 hole and .003 out of ⊥
Accepted as is by foreman (signature)
Mr. W. Hansen
Inspector J. McAllearney

ments, location of critical items or other information that will prevent delays on any new job that is scheduled to hit the manufacturing area.

Tool Designing receives helpful information through the use of a tool trouble card, such as shown in Fig. 10, which is filled out by the inspector in the area where the trouble starts. This person, having inspected the item and witnessed its performance, is in a good position to indicate the tool failure in an unmistakable manner. He is able to determine whether the tool failed because of poor design, operator's negligence, wear through abuse, or because of natural causes. Information of this type can prevent future production stoppage and improve quality.

All instruments, tools or gages requiring repairs are sent to Central Control by the area inspector or department foreman. Upon receiving the item, the repair department fills out, in duplicate, a card such as shown in Fig. 11, one copy of which is sent to the area inspector or department foreman. The other copy remains with the item until it is returned to its original crib. After obtaining the foreman's signature, the card is filed under "Completed Repairs."

The personnel assigned to this section should be familiar with all types of mechanical, electronic and air type instruments used in manufacturing and inspecting. They should be able to repair, calibrate, trouble-shoot and occasionally construct a spare part which may not be available; at times, these men may be called upon to make minor measuring jigs, gages, or special types

TRANSFER NOTICE

Item Name Drill Jig
Taken to Dept. No. 27 Crib No. 8
Reference Log No. 1 Page No. 1
Serial No. D.J. 101 Date 5/27/54
Transfer authorized by Mr. W. Hansen
Remarks
Inspector's Name J. McAllearney

Fig. 9 — A transfer notice, such as illustrated herewith, prevents tools from gathering dust on some shelf while a shortage exists in another department.

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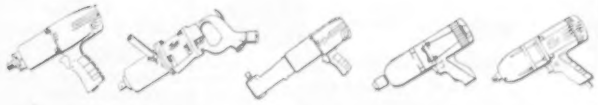
In addition to the immediate advantage of higher output per operator, when you put Thor Impact Wrenches on the job, you reap the long-term benefits of exclusive Thor "low-maintenance" design. Minimum working stresses on extra-sturdy operating parts guarantee worthwhile savings. Investigate today.

20 AIR and ELECTRIC MODELS!

Send for Catalog JE-1672 with illustrations and complete specifications of 20 Thor air, universal electric and high frequency electric impact wrenches, capacity range ¼" to 1¼".



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- No Torque Reaction
- Reversible
- Ball and Pin Bearings throughout
- Impact Spindle rotates in steel
- Impact Jaws rotate for endless wear
- Impact Jaws strike wide-radius blow for added leverage—two blows per motor revolution!
- Impact "cage" (hammer-weight component) moves only in rotary plane. No wasted motion or energy
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- Sturdy Engagement Spring outlasts any other part of tool
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THOR 1954-5

Fig. 10 — Tool Designing receives helpful information through the use of a tool trouble card, as shown herewith, which is filled out by the inspector in the area where the trouble starts.

TOOL	TROUBLE
Item Name: Drill Jig	
Part No.: A 729537	
Date Issued: 3/29/54	
Dept. No.: 245	Sk. No.: S-3201B
Check Cause	T-No.: T-3201
of Trouble	Serial No.: D.J. 101
Negligence: Yes ☑ No ☐	
Accidental: Yes ☐ No ☐	
Worn or Damaged	Operator No. 728
Explain Briefly: dropped drill jig from press base	
Date: 6/4/54	Inspector: J. McClearing

of designs of checking fixtures.

The personnel that is assigned to tool, instrument and gage inspection is a topic which we cannot neglect in our discussion. They should be able to interpret complex drawings, sketches and free-hand drawings. Their knowledge of mathematics should be past simple shop trigonometry. Above all they should be understanding, reasonable, tolerant and firm in their decisions.

Since men of this particular caliber cannot always be readily found when an opening occurs, the department should never be without an apprentice. These men will be handling fine tools and instruments; therefore, some type of commercial hand cream, rubbed on the hands in order to prevent rust created by perspiration, should be kept on the premises. Should hand cream not be available, equal parts of lanolin and unadulterated petroleum jelly, well mixed, will suffice for this particular purpose.

From this discussion we have established that foolproof control can be obtained on practically all functional tools, instruments and gages. It would be unusual to find a modern shop without adequate tool, instrument and gage controls.

REPAIR ORDER NO.		
DATE RECEIVED: 2/6/54	SERIAL NO.: D.J. 101	ITEM NAME: Drill Jig
FROM DEPT. NO.: 245	APPROX. DATE TO BE FIN.: 8/6/54	INSPECTOR NO.: 1042
PROBABLE REPAIRS REQUIRED		
Replacement of upper catch		
" " .250 bushing		
" " base pin		
REMARKS		
CALL EXT. NO.: 378		
WHEN RETURNED FOREMAN SIGN HERE.		

Fig. 11—Upon receiving a tool requiring repair, the repair department fills out, in duplicate, a card such as shown herewith, one copy of which is sent to the area inspector or department foreman while the other copy remains with the item until it is returned to its original crib.

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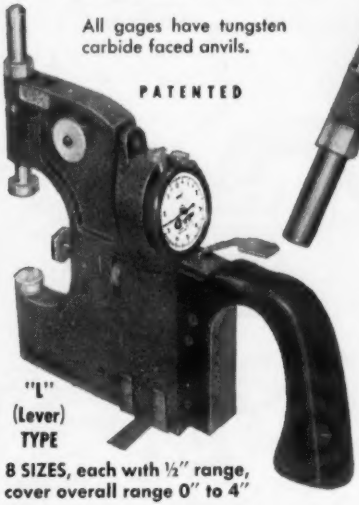
INTERNAL TOLERANCE HANDS, new type, available for all models.
GUARDS protect indicator and support gage when not in use.
"CAPSTAN" adjusting sleeve can be used to limit range of indicator as desired.
BACKSTOP faced with nylon cushion (except 0-1" gage).
INSULATED GRIPS prevent hand warmth from influencing gage accuracy.

PARALLELISM PRESERVED

STANDARD'S new PARALLOC Dial Snap Gages introduce a new type of locking mechanism which maintains remarkably close parallelism between the anvil faces. Ordinary locking mechanisms tend to distort a portion of the frame in a way which swings the pin faces out of parallelism to a degree which is substantial in relation to close tolerances. In PARALLOC, the metal is merely squeezed *along the line of the pin axis,* leaving the parallel condition undisturbed throughout successive relockings of the anvil. *You can rely on parallelism with PARALLOC!*

All gages have tungsten carbide faced anvils.

PATENTED



"L" (Lever) TYPE

8 SIZES, each with ½" range, cover overall range 0" to 4"

"D" (Direct) TYPE

8 SIZES, each with 1" range, cover overall range 0" to 8"

★ **PARALLELISM** of anvils maintained, unaffected by tightness of clamping.

★ **CHOICE OF INDICATORS** . . . any AGD indicator in sizes 1 or 2, with desired dial graduations.

★ **TRIPLE PROTECTION;** Protective indicator guards; "Capstan" sleeve acts as stop to keep gaging plunger within range of indicator, preventing distortion of indicator mounting; STANDARD's fully shockproof mechanism within indicator protects gears from damage.

★ **ANVILS OVERHANG** frame slightly to allow gage to be entered into narrow places and close to a shoulder.

INDICATOR POSITION permits easy entry of gage into narrow recesses. Advantageously placed for observation.

FULLY ENCASED MOVEMENT AND INDICATOR protected against accidental damage.

CLIP-ON STAND holds gage firmly upright.

WRITE for new booklet, "NEWS", describing these and other new STANDARD developments.

STANDARD Gage Co., Inc.
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For that

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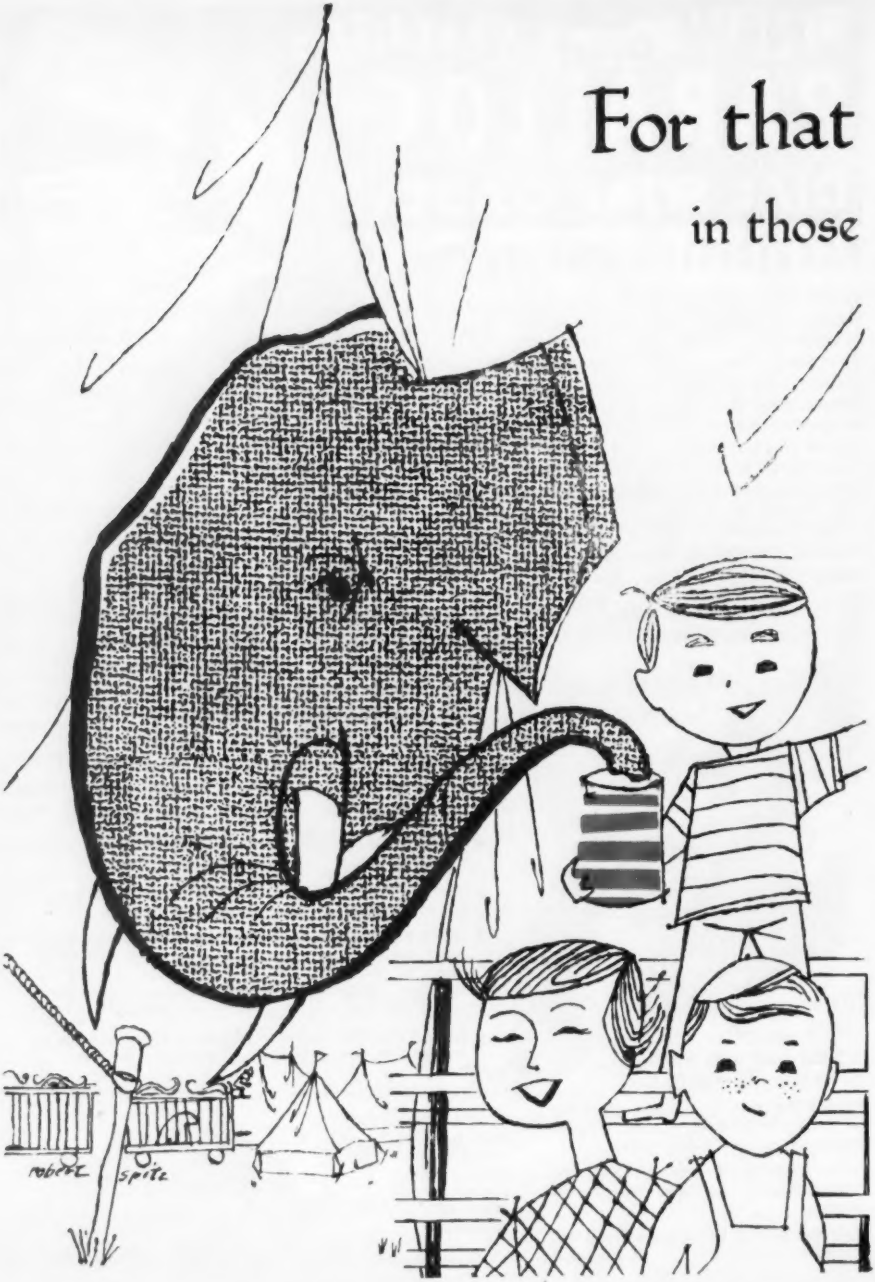

"light fingered" touch

hard-to-get-at places

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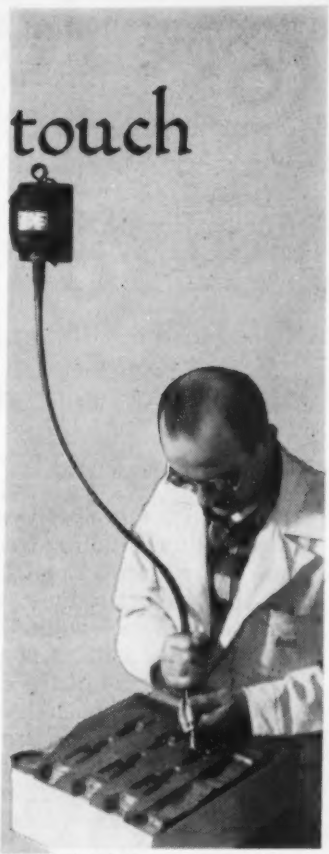
Power with the light-fingered touch—for those hard-to-get-at places! Haskins Flexible Shaft Equipment lets the power do the job without burdening skilled hands with heavy motors. For every job of grinding, sanding, filing, polishing or buffing—from 1/4 HP to 2 HP—Haskins tools increase production and cut costs. Two good reasons why you should write for the latest Haskins Catalog.



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Pedestal

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Suspension

Simple Methods for Handling Sheet Metal Work

By F. E. Riley

In which the author presents two helpful suggestions for handling frequently-encountered sheet metal jobs in shops not ordinarily equipped to perform such work.

THIS article describes two simple methods for handling frequently-encountered sheet metal jobs in shops that are not ordinarily equipped to perform such work. One such job involves the cutting of a square or rectangular hole in the center of a piece of sheet metal. A recommended method of performing this job consists of using an ordinary hack saw and a wooden roller, as shown in Fig. 1. The metal sheet is bent over the roller, with the outline of the required hole already marked in position. The roller and metal are both gripped in a vise, with the metal in close contact with the roller which supports it. Using a fine tooth blade in the hack saw frame, the scribed lines are easily sawed, as shown, with the two opposite sides of the square hole being sawed at the one setting. To saw the other two sides, the metal piece is remounted on the roller so that the second pair of sides occupy the position formerly occupied by the first pair. When these

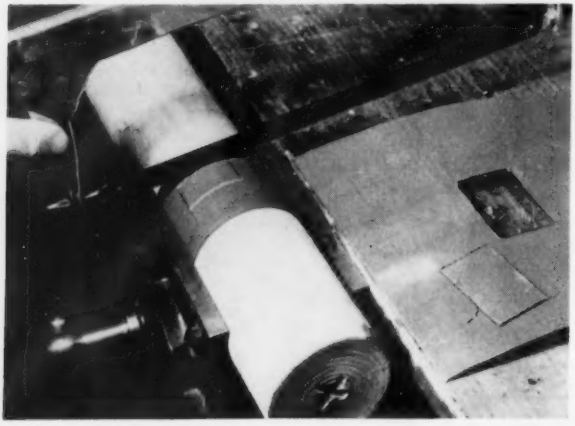
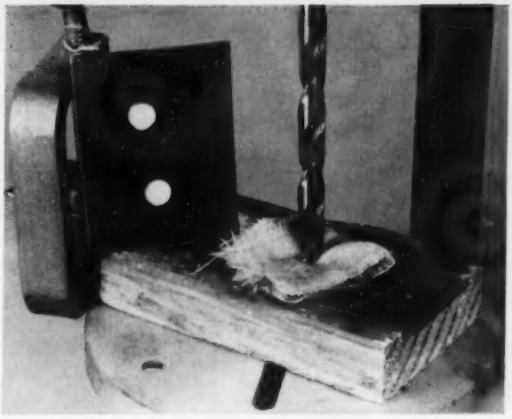


Fig. 1 — This illustration shows a simple method for cutting a square or rectangular hole in the center of a piece of sheet metal using an ordinary hack saw and wooden roller held in a bench vise.

Fig. 2—This illustration shows an effective method for drilling small diameter holes in sheet metal using a scrap of cloth, wooden block, and ordinary drill press.



two saw cuts are completed, the square of waste material can be broken out with the fingers and the corners of the hole cleaned up with a file to accurate right angles.

Heavy gauge sheet requires a larger diameter roller, and large sheets which will not fit in the vise can be held to the roller by means of C-clamps. Heavy gauge sheets of large size which are fairly stiff can be bent over to an arc of large radius and sprung between two parallel supports fastened to the bench top; however, they will not be backed up solidly.

Large diameter holes with smooth edges are not difficult to produce in

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metal sheets with the circular hole saws now available; however, small holes of about ¼-in. diameter or less should be punched out. For the occasional job where no punching equipment is available, smooth circular holes may be drilled in thin sheets by means of an ordinary drill press and twist drill, as shown in Fig. 2. The piece of metal standing upright at the left of the illustration is 0.011-in. thick mild steel. The upper hole was drilled by clamping the metal to a piece of scrap wood and feeding the ¼-in. drill through the metal by means of a portable electric drill mounted on a bench stand. It can be seen that this hole is not absolutely circular. It is actually oversize, and the underside is badly burred; also, depression of the metal surface has resulted.

The lower hole is absolutely circular and to size; the burr on the underside is slight and there is no distortion of the metal surface. This hole was drilled by first folding an old scrap of cloth to four thicknesses and placing it on a wooden block under the drill point. The drill was fed through both the metal and cloth at a speed of about 3,000 rp.m. The cloth served to dampen drill end vibration and chatter so that the drill cut cleanly through the metal.

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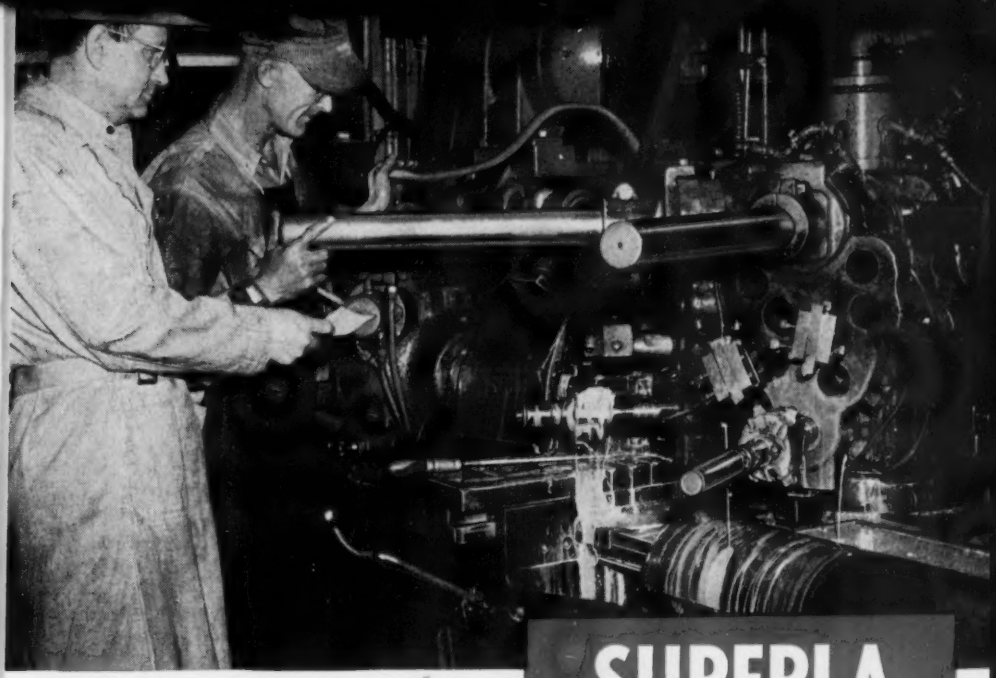

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The Four Wheel Drive Auto Co. benefits 4 ways with →

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Company officials report that on this job, as on many other jobs, SUPERLA Soluble Oil has provided four important benefits: **1.** Mixes readily with cold water. **2.** Forms stable emulsions. **3.** Helps hold close clearances. **4.** Helps provide good finish and tool life.

The experience of The Four Wheel Drive Auto Co. with SUPERLA Soluble Oil testifies to the benefits you can obtain with this outstanding coolant.

Your Standard Oil lubrication specialist will be glad to help you. Phone your local Standard Oil (Indiana) office. Or, write: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

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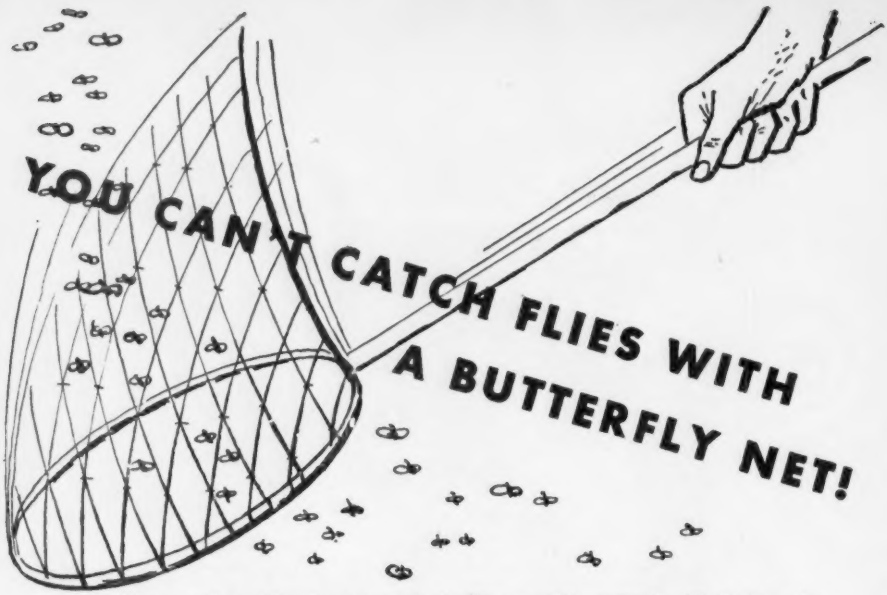

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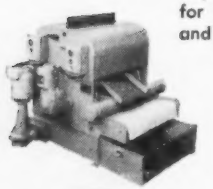

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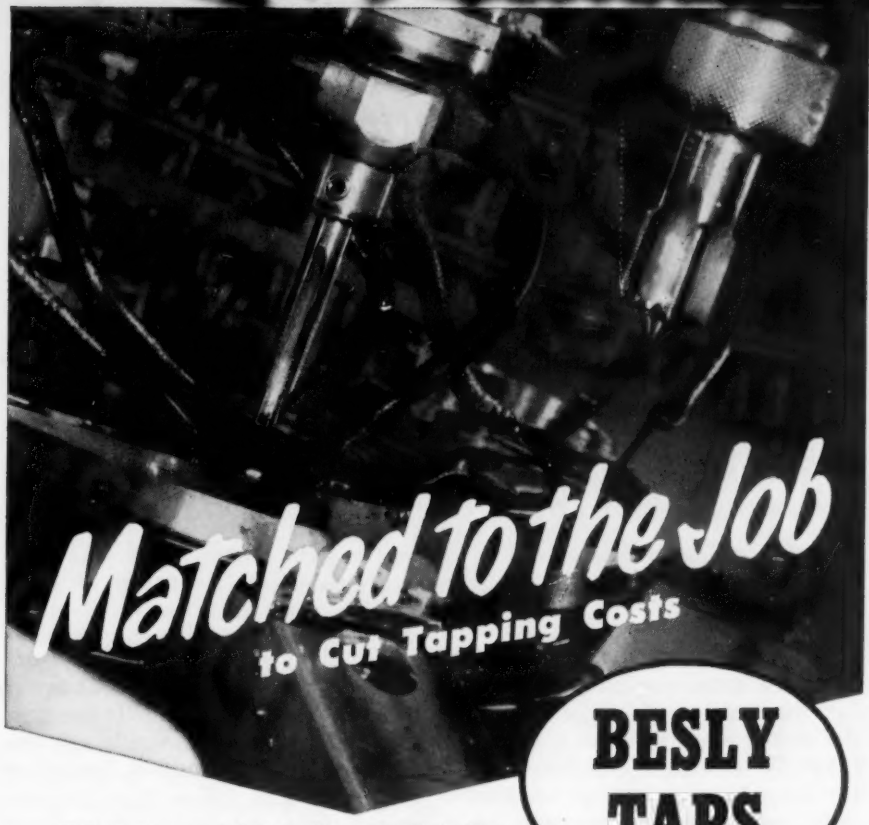

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BESLY TAPS

Poised above an indexing table, these Besly Taps are ready to tap C-1141 steel parts. Operating alternately the smaller Besly 5/8"-24 Tap quickly threads a hole and the work is then indexed beneath the 1-5/32"-24 Besly Tap and a larger hole is threaded.

Tapping costs are kept to a minimum here because these Besly Taps have been carefully selected to match job requirements. As a result, the taps last longer, are freer cutting and make better threads for both time and material savings.

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The handy "Handbook for Tap Users" is full of information on tapping methods and tap selection. WRITE FOR YOUR FREE COPY.

BESLY drills, Reamers and End Mills — High-Speed Cutting Tools in a complete range of types and sizes.

The Fire Insurance Underwriter Looks at Machine Shops

The author points out ways in which machine shop operators can reduce their fire insurance costs by good housekeeping and the utilization of available fire engineering service.

By Clarence T. Hubbard

TWO things of importance relative to fire insurance loom up before the machine shop operator: first, the need for fire insurance to reimburse for any losses, and secondly, the use of the service of fire insurance companies to improve your risk and reduce your rate.

"The machine shop class has changed," declared the senior underwriting official of one of the largest fire insurance companies to me. "It used to be a very profitable class to the fire insurance companies," he continued. "But as an industry it has changed and the loss ratios are very high, which means that the fire insurance companies assume less insurance, and, of course, this leads to higher rates."

"What are the changes?" we asked, "and what can be done about it?"

This long experienced fire insurance underwriter squinted at me a bit and slowly replied: "If the machine shop operators would use the free service of qualified insurance engineers and follow their recommendations, we could bring down the loss ratio in no time."

He went on to say that it was the rapid changing of machine shop operation—one day the shop is a tool making one and the next day the shop is converted into a tank producer for the Army. "It's the sudden changes of operation," he explained. "One process involves paint spraying, another infra-red drying, another welding. We just had a total loss of a machine shop which introduced heat treating. The heat bath was unattended by properly assigned workmen; it boiled over and ignited some aluminum shav-

ings and the whole plant went up.

"Our greatest trouble is with dip tanks. They should be removed to separate, cut-off buildings and should *never* be without automatic closing covers." If the volatile contents of a dip tank catch fire they will burn interminably because the air can only reach a small exposed surface and a 3-ft. deep tank has been known to burn for several hours. To try to extinguish the fire by water is dangerous as this can contribute to an overflow and thus carry the fire to all corners of the building. A dip tank fire has to be *smothered* with a very fine water spray, or by Foamite fire extinguishers, or sometimes by sand.

Dip tanks should always have a cover which will close automatically due to a fusible link which is a heat operating device to release the opened cover in the event of a fire, thereby smothering the flames instantly. These covers are also arranged for manual operation if the automatic device should fail. Such dip tanks are common, easy to obtain, not expensive, and whenever installed will assure you a better chance for fire insurance response.

If it is physically possible, these dip tanks should be in a separate cut-off room, or even outside of the building if only used occasionally. If used constantly they should have a drain pipe attached whereby the contents can also be released. Sometimes there is a hook-up between the tripping device which releases the cover automatically and also opens the drain.

As the vapors from the volatile liquids used are very heavy and will gravitate downward to the floor, there is always a chance for a bad explosion in the lower 6 ft. of your building where the vapors become rich enough to ignite. Therefore, any machine shop establishments employing a dipping process should be well ventilated artificially by fans.

Where there is a continuous process of enamel drying by a battery of infra-red lights, the dip tanks often have Foamite extinguishers permanently installed about them.

"Where there is a continuous process of enamel drying by . . . infrared lights, the dip tanks often have . . . extinguishers permanently installed about them."

In such cases, instead of an automatic closing cover, a hood is recommended which will fence off any water which might come from sprinklers or hose connections.

I have inspected many machine shops and frankly I have found the superintendents indifferent in responding to recommendations. In San Antonio, Texas, I visited a machine shop housed in a long, narrow structure. In front of the shop were beautiful gardens. The office was modernistic. But to the right of the plant was a room, 30 by 60 ft., in which spray painting was performed rather extensively. There were no

fans or spray booth and just ordinary light bulbs. I told the management that this setup was poor from a fire standpoint.

"No," he replied. "We always

". . . a cigarette left near the . . . paint cans set fire . . ."

keep the windows and outside doors open. We don't have much rainy weather. There's plenty of air circulation." He wouldn't do anything about it despite a "rating up" in his fire insurance premium. Fourteen months afterward the shop had a bad fire which originated in this room.

In another machine works in Denver, I found an almost perfect setup excepting that the stockroom was a frame partitioned section with frame shelves. Some of the supplies were in cardboard boxes; others were wrapped in paper. Two long drop lights with frayed cords were in evidence. Lubricating oil in cans, some opened, were on the *bottom* shelves along with some opened cans of paint.

I recommended metal partitions, metal shelves, fluorescent lights and a rearrangement of the supplies. This was ignored. "Costs too much," the superintendent replied. Part of the cost, I explained, would be recovered through lowered fire insurance rates. He still demurred. He is no longer there! *His supply room caught fire—he hadn't enforced the No Smoking rule. A cigarette left near the broken lot of paint cans set fire which gained headway rapidly.*

Just plain good housekeeping is a most important factor to fire conscious machine shop operators. *There should be "No Smoking" signs posted wherever there is anything flammable. Metal scrap and turnings should always be swept up. Motors should be cleaned with rags and solvents. All electric wiring should be enclosed in rigid conduit. Space heaters should be hung from above. Metal boxes and cans should be provided for waste — not cardboard boxes, or paper containers.* Enclosed oil switches will prevent sparks.

In construction try to avoid false

RULES FOR
SHOP HOUSEKEEPING
NO SMOKING SIGNS WHERE THERE IS ANYTHING FLAMMABLE
NO SMOKING
SWEEP UP METAL SCRAPS AND TURNINGS
MOTORS SHOULD BE CLEANED WITH RAGS AND SOLVENTS
OIL
PAINT
ALL ELECTRIC WIRING SHOULD BE IN RIGID CONDUITS
METAL CONTAINERS FOR WASTE
WASTE
SPACE HEATERS SHOULD BE HUNG FROM ABOVE

"There should be 'No Smoking' signs posted wherever there is anything flammable."

ceilings and large undivided working spaces. *Roofs* are highly important. The disastrous General Motors loss was due to a tar and gravel

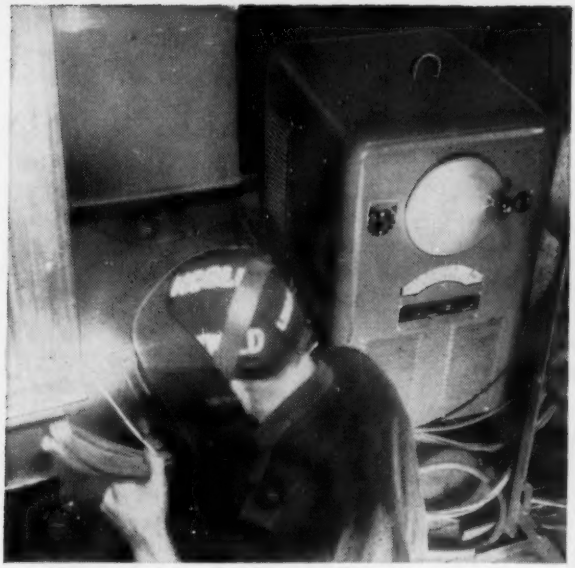

Figure 1. Lincoln INERTARC . . . *New development in quality welding with inert gases. Current range . . . 10 to 350 amps. Can be changed over for conventional AC welding in 2 minutes.*

LINCOLN INERTARC

. . . for high quality, low-cost welding with inert gases

Simplifies Operations. With INERTARC, the arc starts whenever the electrode comes within one-half inch of the work and the arc strike button is depressed. Danger of contamination by touching the electrode to the work is eliminated. Life of electrode is prolonged by accurately timed control of inert gases and cooling water.

Speeds Welding. High responsiveness to changing arc conditions provides steady arc with maximum ease . . . maximum speed of welding without sacrifice of quality on aluminum, non-ferrous and on stainless steel fabrications when AC is specified.

New Safety for Operator. Open circuit voltage on the holder remains at zero until the "start" button is depressed. With INERTARC, there is no continuous high frequency or high voltage for arc starting or welding.

Meets Requirements of F.C.C. for non-interference with radio and TV reception.

DUAL PURPOSE WELDER — INERTARC is easily changed over to conventional AC welding with coated electrodes. Changeover takes 2 minutes.

Send for Bulletin. **Complete description and specifications of Lincoln INERTARC are in Bulletin 1329. Available by writing on your letterhead to**

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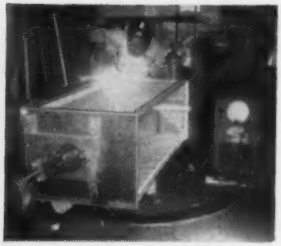

Figure 2. Speeds Fabrication *of utility cabinets from 2-S and 3-S aluminum to cut production costs.*

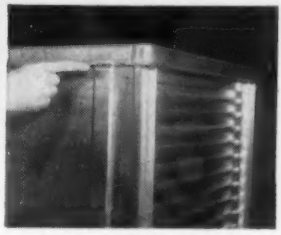

Figure 3. Improves Quality *by producing solid, smooth welds with minimum discoloration to parent metal. Photo shows bead as welded.*

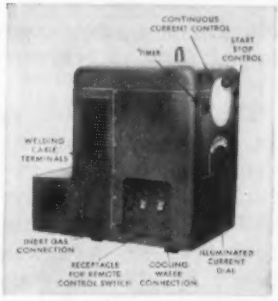

Figure 4. Simple to Install. *Connections for welding cable terminals, cooling water and inert gases are housed in recess at side of machine. Illuminated current dial indicates when welder is turned on.*

THE LINCOLN ELECTRIC COMPANY

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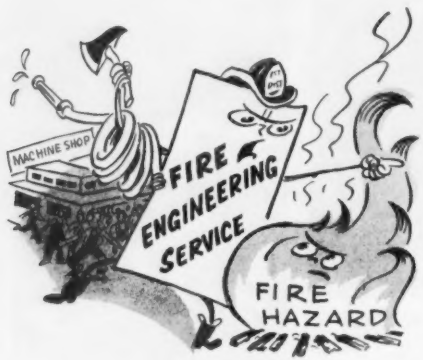
THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

built-up roof which melted from the intense heat. A machine shop with concrete floors and having a steel frame roof and side supports covered with plank on steel and composition shingled can be the means of fire spread both from inside, like General Motors, or outside from nearby exposure. Steel decked roofs or concrete slab roofs are much safer.



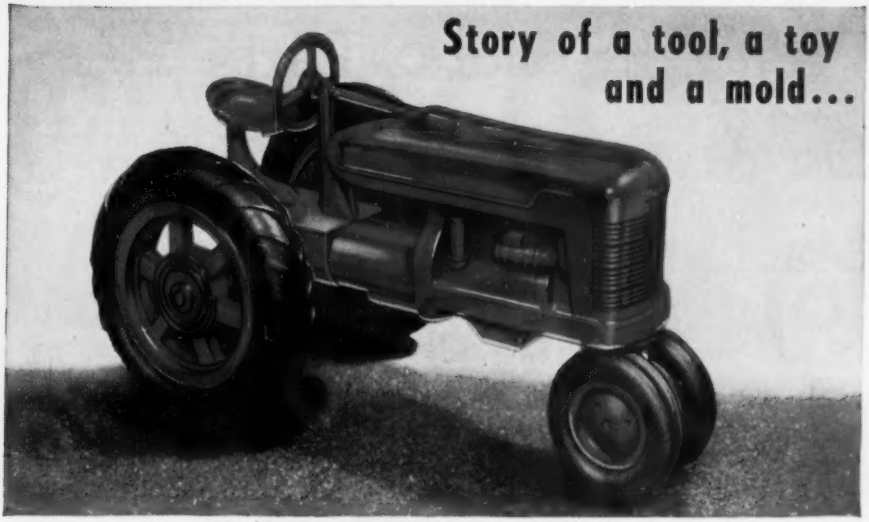
". . . you want fire engineering service to assure the safety of your employees, as well as your physical plant."

The following are some factors you should consider in relation to your fire insurance as a machine shop operator: (1) you want a ready market for fire and allied fire insurance; (2) you want it at the lowest possible cost; and (3) *you want fire engineering service to assure the safety of your employees, as well as your physical plant.*

First, deal with a qualified insurance agent or broker, preferably one who has attended one of the classes in technical insurance training conducted by practically all large insurance companies. Don't peddle your policies with some part-timer who doesn't know his stuff, or some relative. Your business is too complicated.

A good experienced agent or broker usually represents four or five reputable companies. He can obtain well trained *engineers* from these companies, plus special agents, to inspect your plant and your policies. Use this service. It is free. Some agents even make property appraisals, too. And they also have access to your state rating fire insurance bureau which, in turn, has rating engineers available. *Always consult them when planning any new construction.* They will review your blueprints free of cost and by suggestion save you fire insurance costs.

And does your agent understand Business Interruption Insurance, the Gross Earnings Form, the Reporting Form of fire insurance, the new Betterments and Improvements Form, and the latest in the way of "all risk" types of protection? Only *trained,* studious insurance representatives can be fully acquainted with all types of protection. And, it is just as easy to select *good* insurance companies—those of excellent financial background and which also believe in *service to policyholders.* Concentrate with a carefully selected agent, one "worthy of his hire." This will prove long run economy. But cooperate with him and the insurance and the rating engineers. They can help you to *avoid* any break in the *continuity* of your industry. And thus, you will be improving the whole class of machine shop operation.



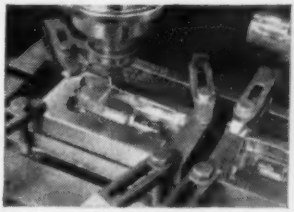
Photos and data courtesy of: Product Miniature Co., Inc., Milwaukee, Wisconsin

...another complex mold milling problem solved by the Rotary Head method

NOTICE the fineness of detail on this scale model! A Kearney & Trecker-Milwaukee Model 2D Rotary Head Milling Machine reproduced those details in the mold. No models or templates were used — the operator worked direct from blueprints. Workpiece material was oil-hardening tool steel.

Work was done from exact scale reductions of the real tractor assembly prints — with only minor details eliminated. There were no delays in beginning, no extra operations. Blueprint dimensions were transmitted directly into metal and fine accuracy was possible because precise control of all operations is built right into the machine.

This exceptionally versatile machine can reproduce geometric shapes in both horizontal and vertical planes. If you have an unusual production problem, it will pay you to investigate the Model 2D Rotary Head Milling Machine. Write for Bulletin D-20, Kearney & Trecker Corp., Milwaukee, 14, Wisconsin.



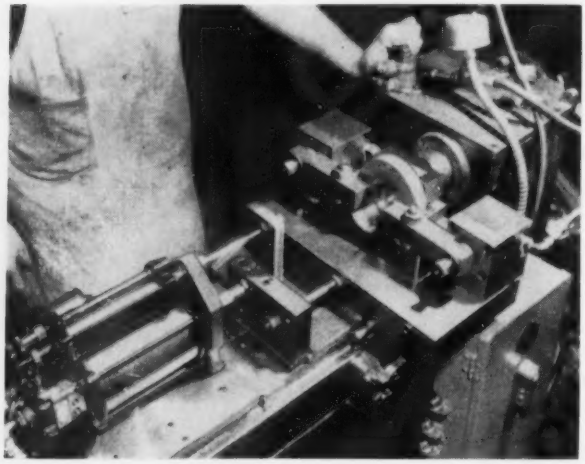
® KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

Producing Clutch Parts On Air-Controlled Machine Tools

Lipe-Rollway Corporation effectively utilizes air power to minimize operator fatigue in manufacturing heavy duty truck clutches.

COMPRESSED air, a simple, efficient and flexible power source, too often is overlooked by machine supervisors planning new production methods. Since officials at Lipe-Rollway Corp., Syracuse, N. Y., discovered the benefits of using pneumatically-activated machine tools and accessories, fatigue no longer is a major factor in the production of the firm's lines of heavy-duty truck clutches, bar feeds and machine tools. What began as a pre-wartime measure to conserve the energies of machinists handling heavy clutch parts has developed to the point today where most production units in Lipe's clutch machining and machine tool departments are air-operated.

The man most responsible for introducing these devices is Laurence H. Kirk, general superintendent at Lipe-Rollway Corporation, who came up from his Havre De Grace plant



Converted 9-in. lathe bores inside diameter of two cyclic balancer castings. As a safety measure, a Bellows electric air valve switch must be activated by operator before machine air switch will function. Air also clamps balancer castings to stationary boring fixture. Air cylinder at left moves carriage forward, forcing stock over a fixed, revolving boring bar.

Located under the assembly bench stations, air cylinders compress the powerful ML clutch coil spring, allowing levers, steel balls, fulcrum and snap rings to be assembled on a bench fixture. Adjusting plate, flywheel ring and sleeve have already been fitted together.

in Maryland 38 years ago to spend two weeks working with Lipe officials on a series of patent drawings. He has been with Lipe ever since. Long a believer in using automatic controls for machine tools, he has been largely responsible for Lipe-Rollway's extensive use of pneumatic devices on machine tools to remove as many elements of fatigue from the hands of Lipe machinists as possible. Because clutch production requires such a variety of setups to manufacture over 30 different clutch sizes and models, air-powered controls, Mr. Kirk believes, are the most efficient equipment to use for the job.

Pneumatic power attachments, consisting of an air source of 100 p.s.i., shutoff and check valves, meters, oiling systems, limit switches and—wherever needed—air cylinders, have replaced foot control levers, T-wrenches and hand chucking or hand drilling operations. As a result, setups are simpler, the rate of accurate machine cuts greater and, Lipe officials say, overall production has been increased 30 per cent.

Although coupled with electricity and hydraulic fluids, air still is the prime source of machine tool power at Lipe. Most machines have air-operated chucks, spindles or collets, as well as air hoses for cleaning purposes. Drill presses, lathes, boring mills and assembly bench fixtures are pneumatically powered. Even chips are conveyed out of the plant to a disposal bin by a system of two air cylinders and a conveyor belt. An air-operated hook lifts a waste car up into position to dump its contents onto the conveyor belt. Upon reaching the top of the conveyor, the waste is dumped into a box where an air-activated door opens, sending the chips hurdling into the outdoor disposal box. The

This blowout stand cleans burrs and filings from four freshly drilled and tapped holes in one operation. An air cylinder, inside the stand base, feeds air to four jets. Depending upon what type clutch is being drilled, positions of jets may be changed readily by inserting fixtures that fit the holes on the clutch pressure plate. Formerly, operator used an ordinary air hose to blow out hole filings.

entire operation only requires the operator to pull two chain switches.

Four compressors in the main compressor room are connected to a common manifold 4 in. in diameter, which serves as an after-cooler. From the after-cooler air flows into an outside storage tank. The condensate which accumulates in this 282.74 cubic foot tank is kept constantly bled through a condensate trap to reduce the moisture content in the compressed air.

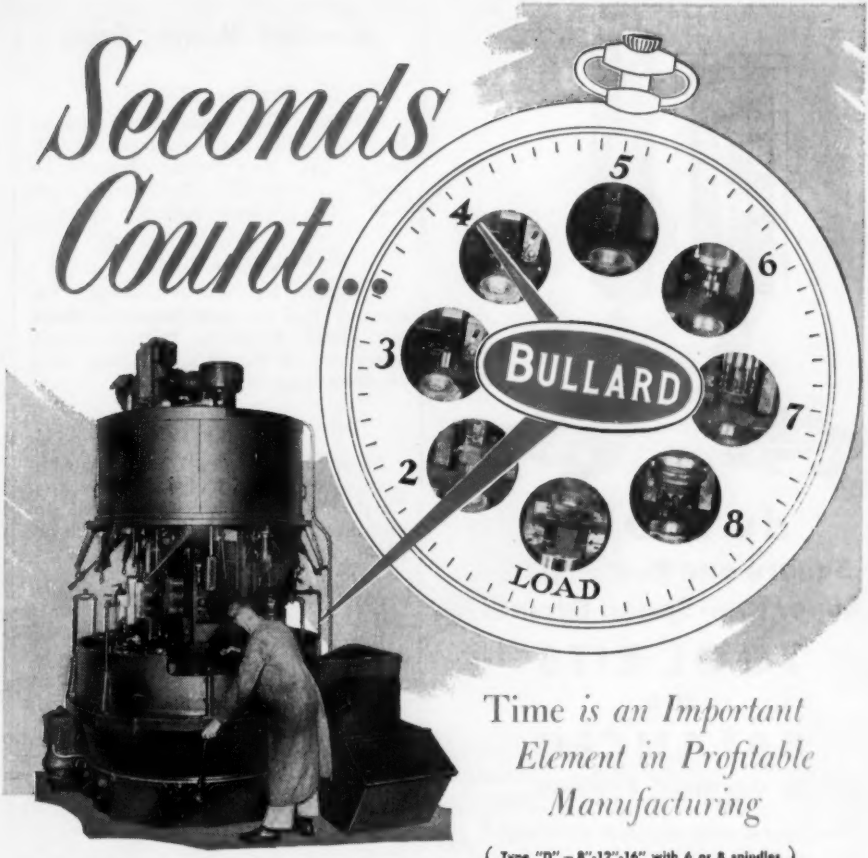
Besides from the main compressor room, air lines also branch out from an auxiliary compressor located in the clutch machining department, with some lines measuring 695 ft. in length. Condensate traps and filters are used to reduce line condensation. In addition, condensate traps segregate assembly department air lines from lines in other areas to prevent moisture damage to air wrench motors.

Air is piped to machines at 100 p.s.i. and then is regulated at the machine by means of a pressure regulating valve to deliver the required amounts of pressure.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

"Well, did you tell the boss today that you didn't want his lousy transfer to Arabia?"

Seconds Count..



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Important Meeting Dates

October 11-14

American Gas Association, Annual Meeting, Municipal Auditorium, Atlantic City, New Jersey. Association headquarters: 420 Lexington Ave., New York 17, New York.

October 11-15

American Institute of Electrical Engineers, Fall General Meeting, Morrison Hotel, Chicago. Institute headquarters: 33 W. 39th St., New York 18, New York.

October 19-20

American Machine Tool Distributors' Association, Annual Meeting, Sheraton-Gibson Hotel, Cincinnati. Association headquarters: 1900 Arch St., Philadelphia 3, Pennsylvania.

October 24-27

American Gear Manufacturers Association, Semi-Annual Meeting, Edgewater Beach Hotel, Chicago. Association headquarters: 302 Empire Bldg., Pittsburgh 22, Pennsylvania.

October 27-29

Grinding Wheel Institute and Abrasive Grain Association, Fall Meeting, Edgewater Beach Hotel, Chicago. Information: Hunter-Thomas Associates, 2130 Keith Bldg., Cleveland 15, Ohio.

October 29-31

Metal Treating Institute, Annual Meeting, Hotel Sheraton, Chicago. Institute headquarters: 271 North Ave., New Rochelle, New York.

October 31-November 3

National Screw Machine Products Association, Fall Membership Meeting, The Homestead, Hot Springs, Virginia. Association headquarters: 2860 E. 130th St., Cleveland 20, Ohio.

T-H-E H-O-L-E S-T-O-R-Y

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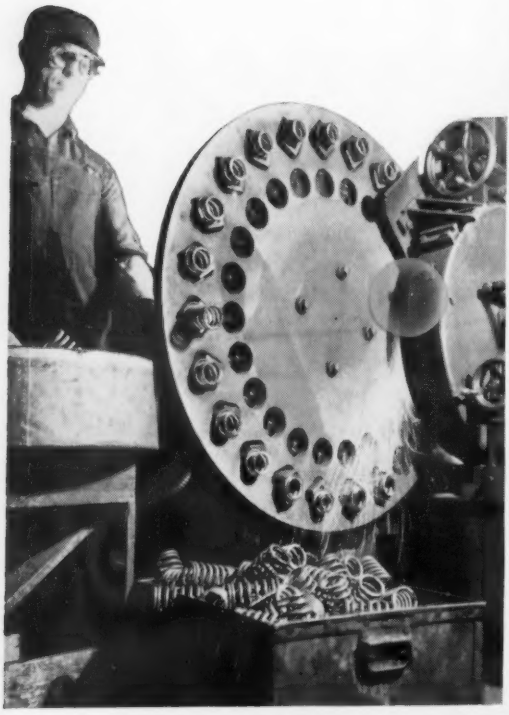

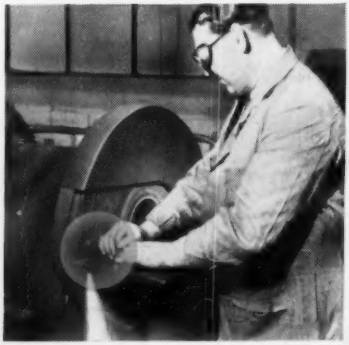

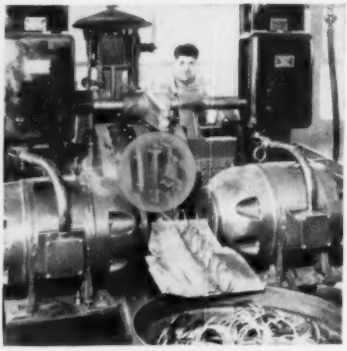

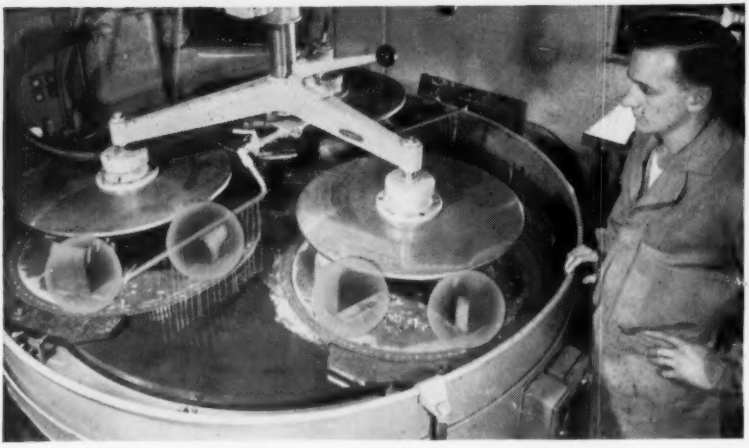

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for practical aid in selecting the Norton discs that will add the money-saving "Touch of Gold" to every disc grinding job you do. Ask him for the new booklet, "Disc Grinding." Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

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"Best discs ever received. Produced over 6,000,000 piston rings — 100% more than our former discs, with 50% less dressing. Results duplicated in subsequent shipment."

"Outlasted and outperformed all other discs — gave 366,975 pieces without burn."

"Averaged 21,500 pieces, a new high for this job."

"Outproduced previous discs 2 to 1."

"High above competition for output and grinding quality."

"Gave 20% longer service life."

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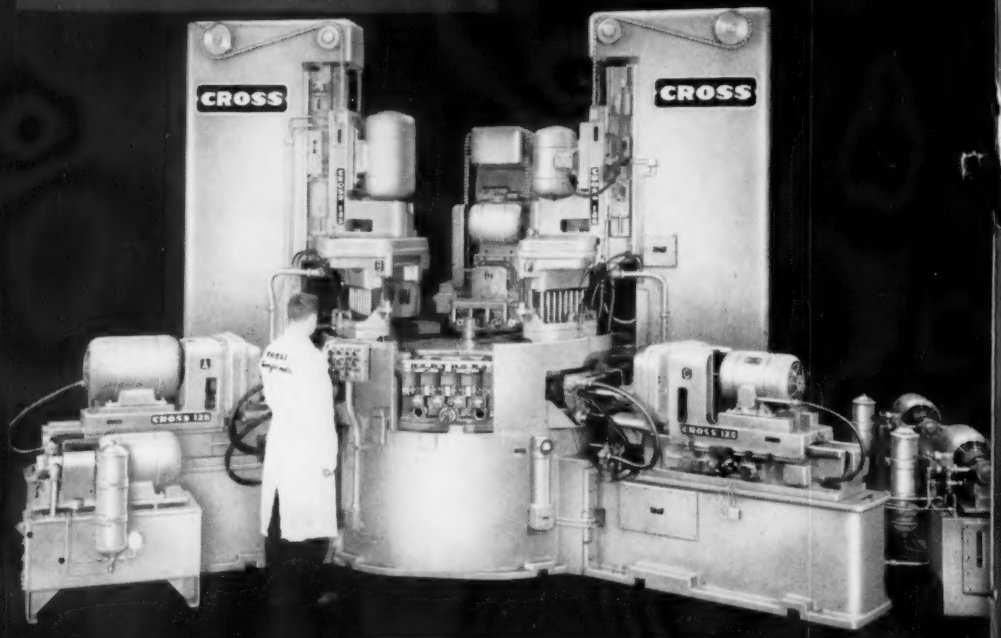

- ★ 450 pieces per hour at 100% efficiency.
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- ★ Drills, reams and chamfers bolt holes; drills, reams and chamfers piston pin hole; and mills lock slot
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- ★ Hydraulic power clamping for work holding fixtures.
- ★ Other features: Hardened and ground ways; coolant system; hydraulic feed and rapid traverse; construction to J.I.C. standards.

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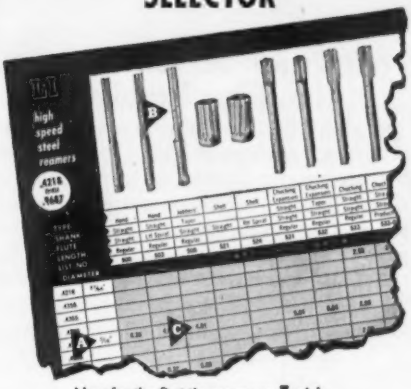

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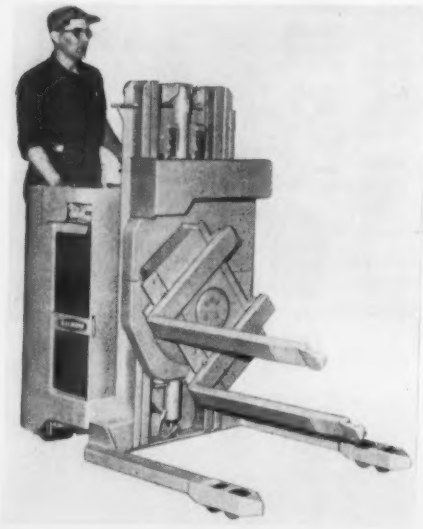
Fork Truck Solves Tote Box Handling Problem

A LARGE manufacturer of business machines had a problem in his automatic screw machine department. Metal turnings were collected in a tote box located beneath the screw machine. As the box became filled, it was necessary for a worker to reach beneath the machine for the tote box, place it on a floor truck, push it to the cutting oil collecting centrifuge machine and return the empty container for reuse.

The Raymond Corp., Greene, N. Y., solved this problem with a rider type fork truck designed for narrow aisle operation and equipped with special hook type revolving forks. The truck is driven up to the screw machine and the fork hooks engage the box handles and pull it out from beneath the machine. The hooks are disengaged by lowering the forks, which are then driven into channels welded on the bottom of the tote box and elevated for traveling. When the truck arrives at the centrifuge machine, the forks revolve, dumping the turnings. The box is then returned to the screw machine for reuse.



Rider type fork truck supplied by Raymond Corporation to business machine manufacturer to facilitate handling of chip-filled tote boxes in automatic screw machine department

New System of Applying Cutting Liquids Facilitates Tire Mold Machining Job

THE new Spray-Lube System of applying cutting liquids, recently announced by the C. A. Norgren

Spray-Lube System of applying cutting liquids allows for increase in surface cutting speed in machining cast aluminum tire molds at O. K. Rubber, Incorporated.

Company, has doubled the speed of roughing and finishing the inside surfaces of cast aluminum tire molds at O. K. Rubber, Inc., Littleton, Colo. Where air cooling was used previously on this operation, performed by a large vertical turret lathe, Spray-Lube has permitted an increase in surface cutting speed from 45 to 75 feet per minute. The depth of cut used for the job likewise has been increased to 0.006 inch.

Welding of chips to the cutting edges of the 14¼-in. face form tools —a serious problem previously—has been eliminated with a considerable saving in tool repair. The quality of the finish is higher, also, since the Spray-Lube System has prevented the galling of workpieces.

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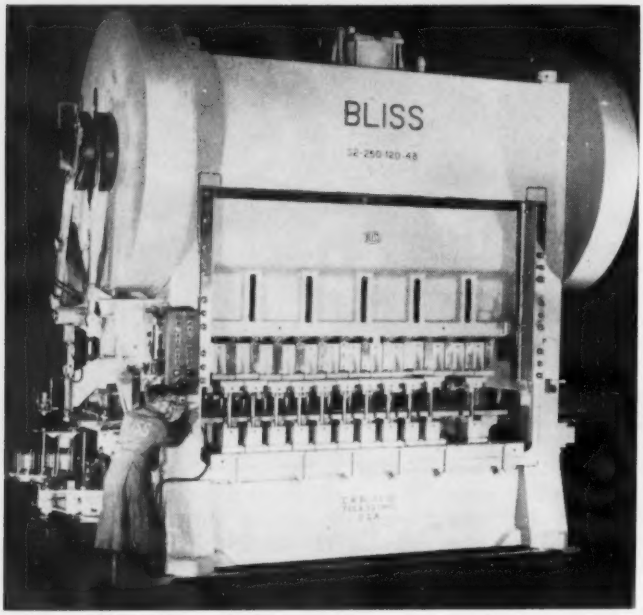

New design of transfer feed press developed by E. W. Bliss Company and recently installed in the Ypsilanti, Michigan, plant of Ford Motor Company to produce starter brush plates

Transfer Feed Press Used to Make Starter Brush End Plates

A NEW design of transfer feed feed press developed by the E. W. Bliss Company, Canton, was installed recently in the Ypsilanti, Michigan, plant of the Ford Motor Company to produce starter brush end plates, as well as other stampings. The huge press features a special stacking and feeding device, an improved slide bar and finger transfer mechanism, and electric controls to guard against any malfunctioning which might be dangerous to the attendant and injure the press and die.

Two cams and yokes attached to the main crankshaft drive the specially-designed automatic transfer feed mechanism. A plunger with a rubber vacuum cup descends to pick up a precut blank and rises to deliver the blank to the fingers. If the plunger does not deliver the blank to the fingers, a limit switch stops the press. As the supply of blanks is exhausted, a limit switch at the lower end of the plunger stroke is tripped and an elevator pushes a new stack

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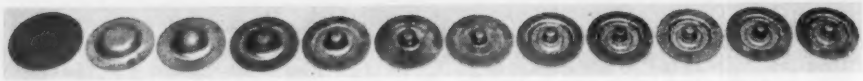


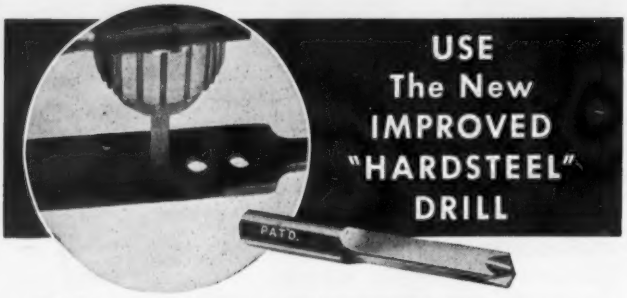
Illustration showing the various stages in the production of starter brush end plate

of blanks into the feed position. When the elevator descends, it trips a switch that starts a motor and turns a six-station turret to the next full station of blanks. If a new supply of blanks does not come into position, a micro-switch stops the press.

Another micro-switch in the transfer feed line prevents double blanks from reaching—and possibly ruining—the dies and damaging the press. If two blanks stick together, they trip this switch and actuate a solenoid which opens a trap door. Both blanks fall through and the press continues uninterrupted.

An equally important feature of the press design is the flexibility of the feed and transfer mechanism to accommodate similar type stampings that require successive or progressive steps or operations. Thus, by feeding itself, checking and correcting misfeeds, performing eleven separate operations, and by delivering up to 28 completed parts for a starter every minute, the press speeds up production and cuts the cost of manufacturing these parts, which were formerly produced by die casting.

Drill Hardened Steels without Annealing—



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon—high chrome steels of any degree of hardness.

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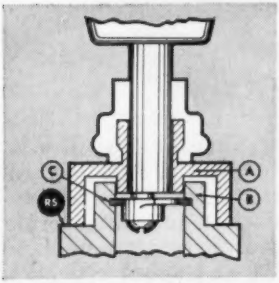
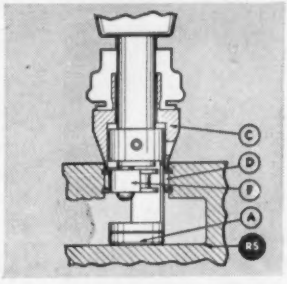
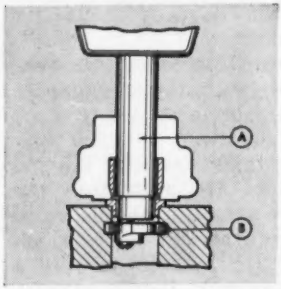


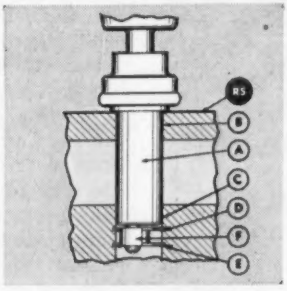
Clearing Obstructions or Protrusions – Waldes Truarc Grooving Tool with *special bushing* with high shoulder A in order to clear obstruction B on reference surface RS so groove can be properly located in bore.



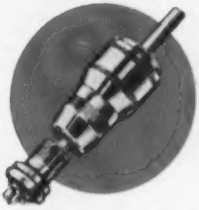
Locating Grooves from Bottom of Hole or Blind Hole—Use of *bottom adaptor* A and double cutter B. Bushing C pilots tool into bore D while bottom adaptor acts as stop to locate grooves from reference surfaces RS below bore.



Small Diameter Bore – Need for Wide Groove – Great versatility of tools allows A-2 Tool to accept *stepped down spindle* and *cuttershaft* assembly A. Provides cutting capacity in a bore normally within the range of smaller A-1 Tool. Illustrated, larger tool capacity necessary to cut groove diameter B exceeding normal capacity of standard A-1 Tool.



Extending Reach of Tool – Waldes Truarc Grooving Tool assembled with *extended bushing* A increases normal range of tool in order to reach proper groove location in bore. Bushing also registers on reference surface RS of workpiece while piloting tool at two points B and C inside bore. Two grooves D and E are cut simultaneously with double cutter F



AMAZINGLY VERSATILE! The Waldes Truarc Grooving Tool adapts quickly and simply to your toughest recessing requirements. With it, even *unskilled labor* can perform high precision, mass production operations.

WIDE CUTTING RANGE! The Waldes Truarc Grooving Tool comes in five models: A-1, A-2, A-3, B and C. This wide variety of models enables you to cut accurate grooves in housings with diameters from .250 to 5.000 inches. Special features, modifications and adaptations allow each model to operate efficiently under many varying conditions.

SEND YOUR PROBLEM TO WALDES! Whatever your internal grooving problem, send us your blueprints and let Waldes Truarc engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job.

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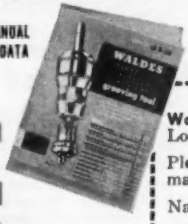

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Waldes Truarc Grooving Tool mfd. under U.S. Pat. 2,411,426

MM-106

Waldes Kohinoor, Inc., 47-16 Austel Place
Long Island City 1, New York

Please send me your new 20-page technical manual on the Waldes Truarc Grooving Tool.

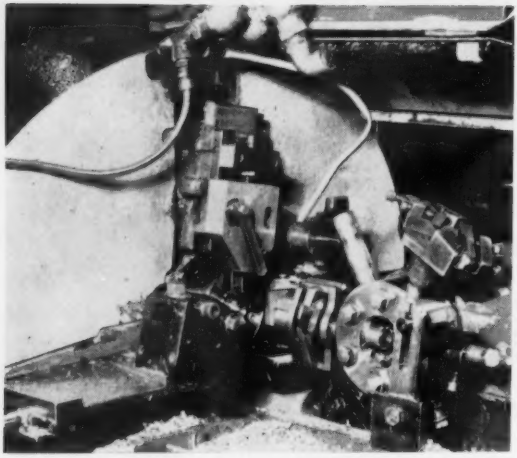
Name_____

Title_____

Company_____

Business Address_____

City_____ Zone_____ State_____



New Method automatic marker in the vertical cut-off slide on the automatic screw machine permits simple installation of the die-head opening bar for use during production of threaded parts.

"Extra-Operation" Marking Tool Assures Positive Identification of Valve Bodies

VOLUME production of both sweat-type and pipe-threaded plumbing valve bodies at Brass-Craft Manufacturing Company, Inc., Detroit, presented a problem in identification. Since the company normally ships to plumbing equipment manufacturers who in turn sell to individual plumbing contractors, there were several places where the parts could be misdirected. It was not uncommon for sweat-type parts to be returned as defective due to "blank threads."

E. H. Merchant, vice president of manufacturing at Brass-Craft, called in New Method Steel Stamps, Inc., Detroit, producer of automatic screw machine marking devices, to provide a unit that would not only imprint positive identification on the parts but also would not require an extra station on the screw machine. All stations were already in use for other operations.

It was decided to install a New Method Model 700 automatic marker at the final machining station to mark the part and cut it off. Relative positions of the segment marking die and the cut-off tool are such that the characters are stamped on the valve bodies first as the cut-off tool advances. Since the roll die is only a segment of a circle, it is carried clear of the part after marking and the cut-off tool continues to advance until the job is completed.

Valve bodies are produced at a rapid rate from extruded brass shapes. Spindle speed of the Brown &

for rapid slotting

OF STANDARD AND SPECIAL SCREWS

The KENT SEMI-AUTOMATIC SCREW SLOTTER

Parts are inserted into a revolving disc which carries them past a slotting saw and ejects them into the pan of the machine.

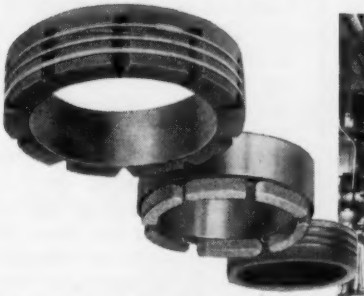
Speeds and feeds are changeable to adapt machine for slotting any kind of metal. Handles all types of heads; also does light milling of similar parts.

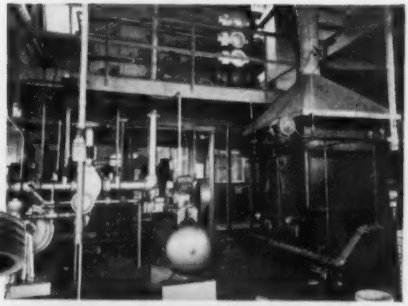
Write for illustrated bulletin.

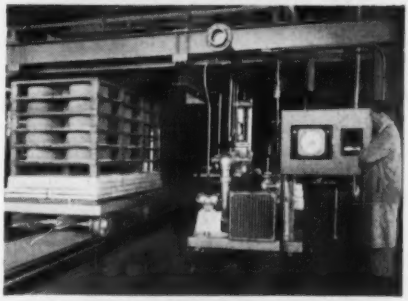
The KENT MACHINE CO., Cuyahoga Falls, O.

Drillers - Threaders - Slotters - Countersinkers - Bar Pointers

From the NEW Blanchard Wheel Shop







VITRIFIED WHEELS

For more than 25 years, Blanchard has directed its efforts toward developing the best grinding wheels for Blanchard Surface Grinders. It began by pioneering with silicate bonded wheels, and then resin bonded wheels. Now, from a new, ultra modern Blanchard wheel shop come *vitrified wheels* ... scientifically batched, pressed and fired ... with positive control of time and temperature.

Today, Blanchard offers complete wheel service ... silicate, resin and vitrified!

Use Blanchard wheels on your Blanchard Surface Grinder. They do a better job in less time, with less trouble and cost ... whether your work is tough as copper or fragile as glass ... whether it requires heavy roughing cuts or clean-up cuts with flatness to .000005" and finish of 1 micro-inch.

for Better Blanchard Grinding

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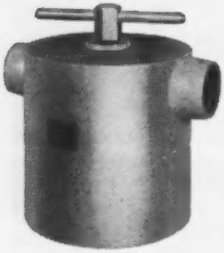
—1—



Models PQ-4 and larger

Keep coolants free from chips and other small ferrous particles such as rust and scale on critical operations like tapping and threading, deep drilling and reaming, trepanning and gear cutting. Removal of magnetic particles contribute to longer tool life, more production between grinds and finer finishes.

—2—

Models PQ-3 and smaller

Keep lubricating oil and hydraulic fluids free from minute particles of metal worn off working parts as well as scale and rust. You'll reduce damage to pumps, bearings and gears; cut down maintenance and costly repairs.

Send for BULLETIN PM-79

S. G. FRANTZ CO., Inc.

P. O. Box 1138 **Trenton 6, N. J.**

Sharpe Model 2G high speed automatic screw machine used is 2,180 r.p.m. Location of the automatic marker in the vertical cut-off slide permitted simple installation of a die-head opening bar on the front of the unit for use during production of threaded parts.

According to E. H. Merchant, the new unit requires only 10 minutes' setup time and in effect adds an additional slide to the machine. It saves 2 to 3 seconds' production time per part over a separate "swing marking" operation and many times that over secondary marking. The same marking tool is also used for other parts produced by Brass-Craft where both front slides and back slides are in use.

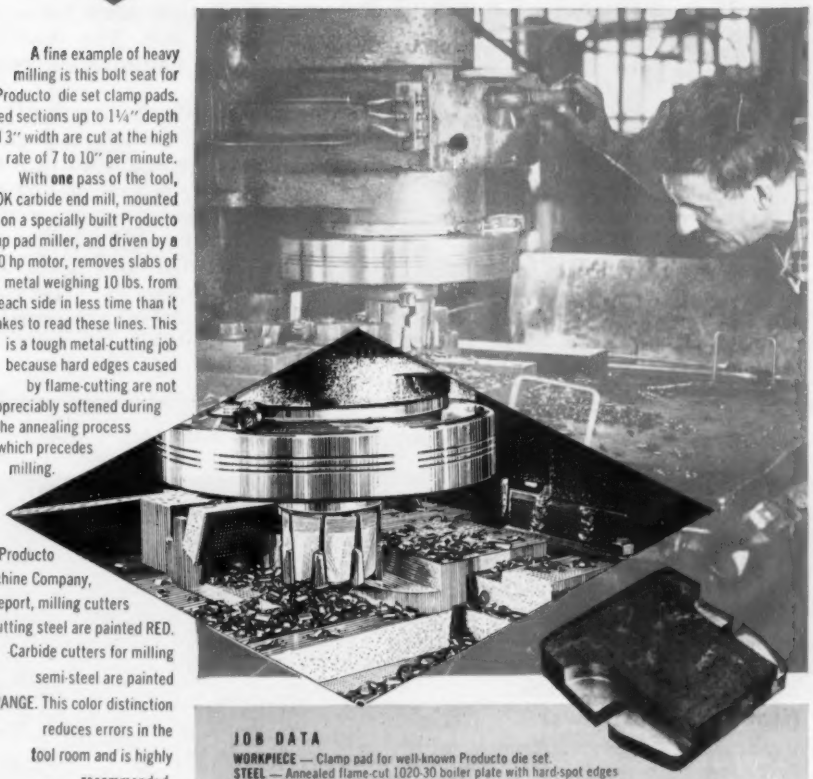
New Carbide Grade Effectively Applied to Difficult Turning Job

AN aircraft landing gear manufacturer making difficult cuts on heat treated steel forgings increased tool life by 6 to 1 with the use of a new cemented carbide grade 350 cutting tool. On a landing gear torque strut of 4340 forged steel heat treated to 220,000 p.s.i. tensile strength, Menasco Mfg. Co., Burbank, Calif., was obtaining an average production of only one part per tool grind when the job was running at 170 s.f.p.m. Rockwell hardness at this heat treat is around 46 "C." The speed was increased from 170 to 227 s.f.p.m. when a new carbide designed especially by Carboloy Department of General Electric Company, Detroit, was put on the job. One-half hour per day machine down time was eliminated, and the cost of the operation was sharply decreased.

Work was performed on a Mon-

OK carbide end mill hogs out tough, torchcut 1020-30 boilerplate for Producto Die Sets

A fine example of heavy milling is this bolt seat for Producto die set clamp pads. Milled sections up to 1¼" depth and 3" width are cut at the high rate of 7 to 10" per minute. With **one** pass of the tool, an OK carbide end mill, mounted on a specially built Producto clamp pad miller, and driven by a 30 hp motor, removes slabs of metal weighing 10 lbs. from each side in less time than it takes to read these lines. This is a tough metal-cutting job because hard edges caused by flame-cutting are not appreciably softened during the annealing process which precedes milling.



At Producto Machine Company, Bridgeport, milling cutters for cutting steel are painted RED. Carbide cutters for milling semi-steel are painted ORANGE. This color distinction reduces errors in the tool room and is highly recommended.

JOB DATA

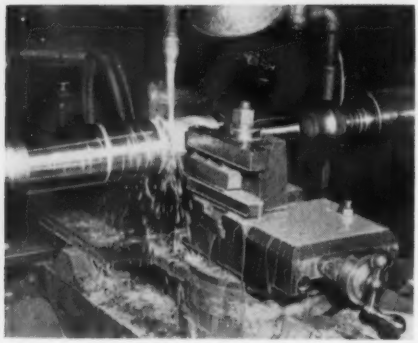
WORKPIECE — Clamp pad for well-known Producto die set.
STEEL — Annealed flame-cut 1020-30 boiler plate with hard-spot edges caused by terrific heat from the torch.
MACHINE — A special clamp pad miller built in Producto's own shop powered with a 30 hp motor.
CUTTER — A 5"-8-blade OK carbide end mill, the only mill found capable of handling this tough job.
RESECTION — A piece irregular in shape varying from 10 to 15" in length, 2-3" in width and up to 1¼" in depth.
FEED — 7 to 10" per minute.

Write for OK Tool Catalogs

TWO COMPONENTS— BODY AND BLADES

modern milling cutters for modern milling machines

THE OK TOOL CO., INC., Milford, New Hampshire



Machining speed on this 4340 forged steel, heat treated to 220,000 p.s.i., was increased from 170 to 227 s.f.p.m. when carbide grade 350 was applied. The machine is a Monarch 25-in. lathe with air tracer attachment.

arch 25-in. lathe with air tracer attachment. The cut was 3⅞ in. outside diameter x 36 in. long, with turning accomplished at varying depths of cut through scaly stock. The setup conditions were average with excessive tool overhang required to clear a flange on the part and only a moderate flow of water soluble coolant available. Two roughing cuts varying from 0.060 to 0.200 in. and a finish cut of 0.060-in. depth were taken with Carboloy grade 350. The feed used for the job was 0.010 in. per revolution.

A standard Carboloy tool was slightly modified for this application. A positive 3-degree side cutting edge angle and 15-degree end cutting edge angle were combined with a zero-degree back rake and positive 6-degree side rake. Relief angles were 6 degrees and clearances 10 degrees, and a 1/32-in. nose radius was used. The chipbreaker was 0.060 in. wide x 0.015 in. deep.

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for all metal cutting

Metal Saw Sharpeners

(Hot and Cold Saws)

For Automatic Grinding of Cold Metal Saws.
Rigid — Accurate — Fast.
Ball Bearing Mounted Head Slides.
Heavy Duty Construction Throughout.

For inserted tooth, segmental type, solid tooth circular saws made in three sizes —Models 1130, 1160, 1172.
Saw capacities 8 to 72 inches and larger.
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Two Views of High and Low Toothed Metal Cutting Saws

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World's Largest Manufacturers of Shear Blade, Knife and Saw Grinding Machinery

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Cuts Metal 15 Times Faster than Hand Hack Saw!

NEW . . . Porter-Cable Portable Band Saw

only $215.00

Slices through 1½" cold rolled steel in 41 seconds! That's fifteen times faster than a good man with a hack saw . . . *two-and-a-half times faster* than bulky power hack saws!

You can use this 16-pound work-demon anywhere—on ferrous or non-ferrous metals or "problem" materials. Take it into equipment yards, stock bins . . . tight spots where costly hand sawing is the only other answer. Use it for general maintenance, teardowns. Compact, easy to handle, Porta-Band delivers smooth controlled sawing in any position. Only the cutting part of the blade is exposed. Cutting action pulls the blade snugly into cut, holding saw firmly in place.

Powered for heavy duty . . . perfectly balanced . . . Porta-Band handles the toughest assignments. Band speed of 240 feet per minute insures swift, smooth cutting of all materials up to 3¼" diameter round, or 3¼" x 4¼" rectangular. Highest grade precision ball and needle bearing throughout. Aluminum alloy frame for lightness, toughness. Universal 115V AC-DC, 25-60 cycle motor (230V available at extra cost).

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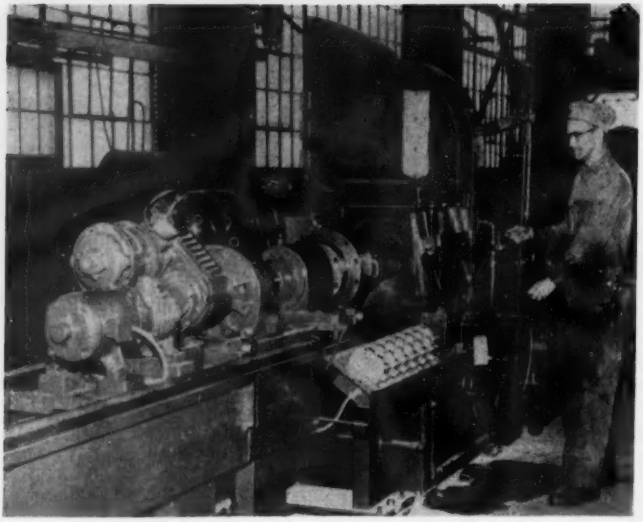

This new cut-off machine at International Nickel Company's Huntington (W. Va.) Works is said to have increased production of harder nickel alloy billets five times.

Cut-Off Machine Provides for Increased Billet Production

A NEW cut-off machine of advanced design manufactured by the Campbell Machine Division of the American Chain & Cable Co., Bridgeport, Conn., has increased production of harder nickel alloy billets by at least five times, according to production figures released recently at the International Nickel Company's Huntington (W. Va.) Works. Prior to the installation of the No. 514 machine, International Nickel's method of cutting the harder high nickel alloy billets, measuring about 8 in. in diameter, resulted in an average production of four billets per shift. With the new machine, production is running at about 25 per shift with an anticipated production of 30 billets.

Functionally, there is less time lost through breakage, grinding and resharpening than with the previous methods of cutting. A 26-in. diameter cut-off wheel on the Campbell machine has successfully cut 14 billets per wheel. A feature of the design causes the alloy to be cut to be slowly rotated to ensure even cutting all the way through. It also permits a smaller abrasive wheel to be used than previously in cutting billets up to 14 in. in diameter.

HIGH SPEED or CARBIDE
BORING TOOLS
For MASS PRODUCTION
• FAST PERFORMANCE
• ECONOMY IN PRODUCTION
• EFFICIENT IN RESULTS
FOR HOLES FROM 1/16" UPWARD
17 DIFFERENT SIZES
Write For Complete Data
• CONSTANT SHAPE OF CROSS SECTION
• LONG LIFE
Dealers! Here's a Profit-Maker!

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NEW, LIGHTER,

more powerful...

SIOUX

ELECTRIC DRILLS

This NEW ½" Drill has the power for heavy duty work. It's shown here equipped with diamond drill going through the high carbon steel of a bumper. Side handle is movable. It's Model No. 1498!

Carbon comes out of combustion chambers in a hurry with this NEW ¼" Drill shown here equipped with wire brush. It's lightweight, compact, ideal for mechanics' tool kits. Ask for the NEW Sioux Model No. 1475!

There's an answer for those hard to get at places in automotive, aircraft, and industrial work—it's the popular Sioux ¼" all-angle Drill, designed especially for working in close quarters.

Use SIOUX all the way through!

Electric Drills, Sanders, Polishers, Bench Grinders, Portable Grinders, Valve Seat and Face Grinders, Electric Hand Saws, Flexible Shafts, Abrasive Discs.

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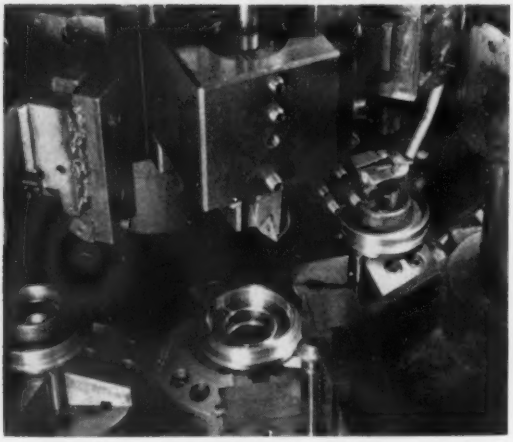
ALBERTSON & CO., INC.

SIOUX CITY, IOWA, U.S.A.



Production of S.A.E. 1020 forged steel liner rings has been increased from 200 to 800 pieces per shift while tool cost has been reduced approximately 50 per cent by utilizing Kendex insert tooling.

"Expendable" Carbide Tooling Quadruples Output of 8-Spindle Automatic

THE production of S.A.E. 1020 forged steel liner rings at the plant of a prominent equipment producer has been increased from 200 to 800 pieces per shift by utilizing tungsten carbide tooling. Both sides of the workpiece are machined by double indexing the 60 h. p. 8-spindle New Britain automatic and reversing the part in the chuck. Operations performed include multiple turning of both the outside and inside diameters, in addition to facing and chamfering of the parts. Work is handled at a feed of 0.006 in. per revolution and a speed of 535 r.p.m. at 570 maximum surface feet per minute. Depth of cut varies between 1/8 and 5/8 in. on roughing and 0.030 and 0.050 in. on finishing.

Heretofore, these operations were performed with standard tipped carbide tooling which required excessive down time for tool changes. With the standard Kendex square and triangular inserts of grade K3H Kennametal now used, a new cutting point is obtained simply by loosening the socket-head screw and rotating the tip to a new cutting edge.

IMPORTANT NOTICE
The Genuine MAUSER
VERNIER CALIPER
IS NOW MADE OF
STAINLESS STEEL
THROUGHOUT
$14.75 PPD
AND THE FOLLOWING IMPROVEMENTS HAVE BEEN ADDED
• SPECIALLY LONG VERNIER to read thousandths
• HARDENED PHOSPHOR-BRONZE adjustable gib retains accuracy
• 2 GRADUATIONS - 1/1000" - 1/128" - 1/10 mm in back
Request illustrated folder showing complete line of MAUSER Toolmakers Calipers, Height Gages, Bevel Protractors and Tool Steads.
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UNIVERSAL VISES

You'll save time and money if you use Wesson 3-Way Universal vises for angle milling, grinding and drilling. You can use "Standard" tools for "Special" work and cut set-up time in half.

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BUILT TO WESSON STANDARDS OF QUALITY AND PRECISION

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Please send me illustrated bulletin of WESSON Universal VISES and ANGLE PLATES.

Name and Title

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City State

Magnetic separator located adjacent to the press operator enables her to readily grasp strip steel sheets for quickly feeding into the press.

Magnetic Separator Facilitates Strip Steel Handling

BY the use of a Basco magnetic separator, E. H. Titchener & Co., Binghamton, N. Y., has overcome problems of separating strip steel sheets so that they can be grasped quickly by press operators, thus eliminating a constant recurring detriment to fast production. As shown in the accompanying illustration, the operator places the separator near the machine, stacking the strip steel between the mounting plates. Each sheet is automatically raised for easy grasping. No tools are necessary to lift the sheets. Stainless steel wear strips are provided to keep the sheets away from the aluminum mounting plates, thereby preventing wear on the plates and possible damage to the

CHICAGO STEEL HAND and POWER

BENDING BRAKES

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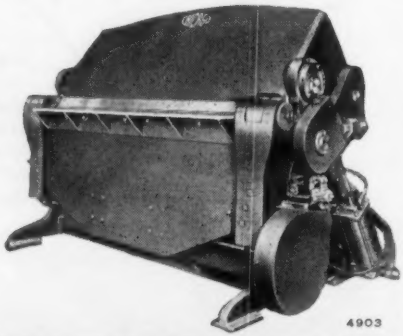
BENDING STEEL PLATE and SHEET METAL

Special Bending Brakes
Double Folder Brakes



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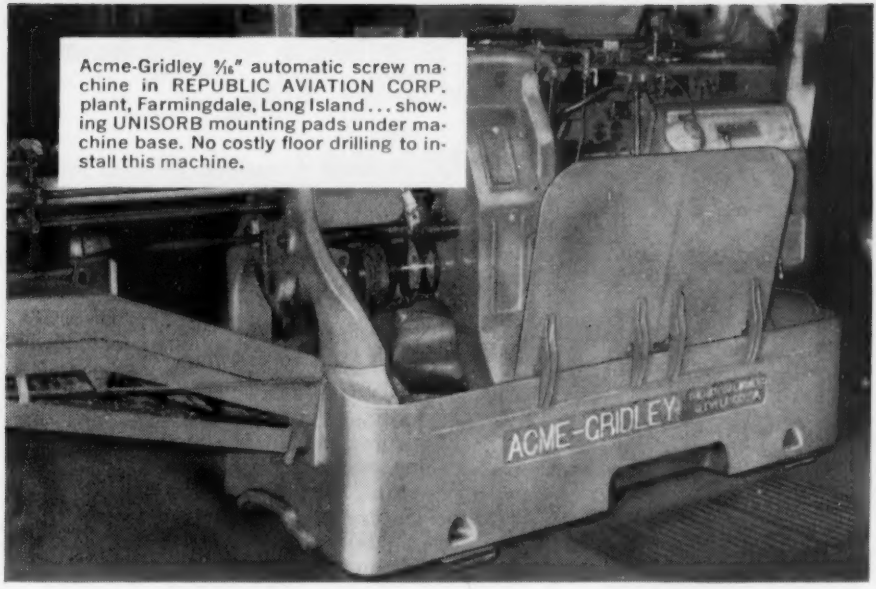

Acme-Gridley 5/16" automatic screw machine in REPUBLIC AVIATION CORP. plant, Farmingdale, Long Island . . . showing UNISORB mounting pads under machine base. No costly floor drilling to install this machine.

AT AN AVERAGE COST OF LESS THAN $10.00 YOU CAN REDUCE VIBRATION, INSTALL MACHINES SECURELY ON

UNISORB® MOUNTING PADS

Your first saving when using UNISORB is in the cost of the mounting pads, an average of less than $10.00 per machine. And savings in first cost are only the start. You also save 10% to 30% in time and labor for installation, because with UNISORB you do not have to drill floors . . . or patch floors when you move machines. Transmitted machine vibration is reduced up to 85%.

"FACTS ABOUT ANCHORING YOUR MACHINES ON UNISORB" gives you complete information about this modern machine installation method. Just return the coupon for your copy.

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ERRINGTON TAP-DRILL ATTACHMENT

Capacity to 1/4" drill and 5/16" tap. Available with 2, 3 or 4 Spindles. Spindles spaced to handle work up to 5½" outside diameter.

ALL ON ONE DRILL PRESS SPINDLE

. . . without taking your hand off drill press feed handle. Yes . . . with this new Errington Tap-Drill attachment, you simply slide the work under the head from one spindle to another. An automatic reversing tapping spindle is built in, making it unnecessary to reverse the drill press for tapping. Hardened and ground spindles. Gears turned on spindles (not pinned on). Heavy duty grooved ball thrust bearings all enclosed in a sand cast aluminum case and cover.

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edges of the sheets so that precision sizes can be maintained for specific jobs.

Coated Abrasives. Revised Edition. By E. B. Gallaher. Published by Clover Mfg. Co., Norwalk, Conn. 36 pages.

Originally issued in 1945, this handbook and digest of coated abrasive technology has been completely revised to keep pace with a fast-moving industry. The booklet contains information on many kinds and forms of coated abrasives, their uses and manufacture, their limitations and their proper handling. Written in simple, understandable language, it incorporates a wealth of valuable technical data, much of it little known by many of the users and sellers of abrasive products.

The booklet will be sent free on request to users and sellers of abrasives, to educational institutions and to libraries.

"Let's put it this way—I *had* a raise when I left the office."

BE *Sure* YOUR NEW ENGINE LATHE CAN *Take* IT!

The engine lathe you buy today could be the one you will call upon for 'round-the-clock production. Make sure, before you buy, that the lathe of your choice can take such punishment.

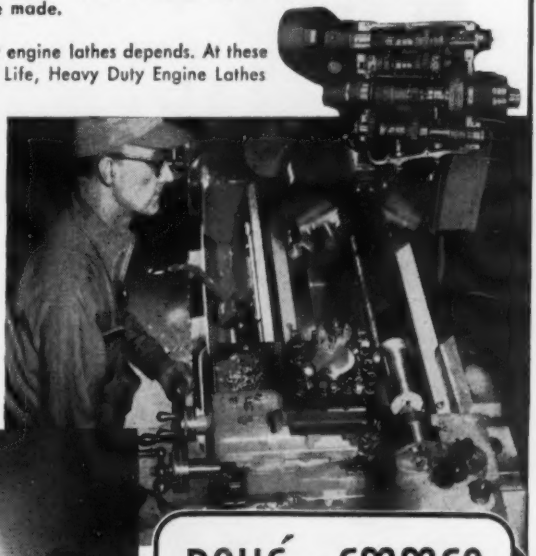
ASK ONE QUESTION!

What is the headstock gear arrangement?

MAKE SURE OF THREE POINTS

(1) That all gears are arranged in a horizontal plane, easy of access.
(2) That gears are in constant mesh, with speed changes effected by means of sliding jaw clutches, eliminating gear wear due to shifting action.
(3) That the "back gear" is in *front* of the spindle, exerting its powerful downward thrust to offset the lifting action of the tool when heavy cuts are made.

On these three points long life for engine lathes depends. At these three points Boye & Emmes Long Life, Heavy Duty Engine Lathes excel.



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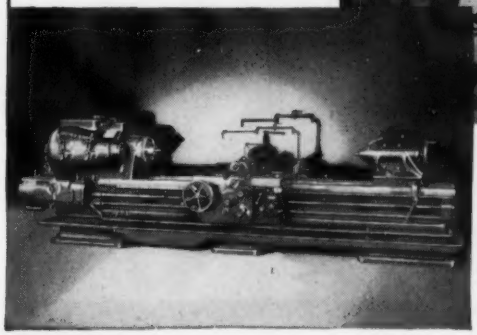
Write for our free Bulletin No. 603 today and count the B & E exclusives. Tomorrow you may need the information.

"Back-gear-in-front" guards spindle bearings during heavy cuts.



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Frankly, we were surprised when we learned* how many different industrial parts were being made from Johnson Universal Bronze. Thousands of manufacturers and machine shops have discovered that these bronze bars are available in several hundred sizes and inside-outside diameter combinations . . . that they are ready machined . . . that they save time and money. For short runs or individual bearings or parts, they are an ideal material. Johnson Universal Bronze is free cutting with ordinary tools. Its high quality alloy assures long, troublefree performance. Over 400 sizes available from your local Johnson Distributor in machined solid and cored bars, 13 inches long, and in hexagon bars, not machined.

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JOHNSON JB BEARINGS
Sleeve-Type

SLEEVE BEARING HEADQUARTERS SINCE 1901

The weight of eight elephants

...but the precision of a fine watch!

AN OVERSIZE GRANITE SURFACE PLATE by Herman Stone

The Granite Surface plate shown here weighs 25 tons—yet it has been ground and polished to perfection by Herman Stone craftsmen to .005 mean overall tolerance! . . . And this precision is *permanent!* Granite will not warp, dent or bulge. It is not affected by strain or temperature changes. It remains perfectly level—permanently!

What's more, Granite is *harder* than nearly every type of tool steel! It wears years longer than metal and is maintained at a fraction of the cost. Whereas some types of plates require resurfacing every 6 months, many *Herman Stone* Plates have been in constant use for more than 12 years without a single resurfacing!

Herman Stone Granite Surface Plates Pay For Themselves—by saving maintenance, resurfacing, checking and production time!

Get full details on Herman Stone Pink or Grey Granite Plates—"regular or elephant-size." Free estimates of your requirements—no obligation. Write today!

The Herman Stone Co.

324 Harries Building, Dayton 2, Ohio

First in the Field—Still First in Quality

ideas from readers

V-Block Reference Point Locator

By Charles Gonday

WELDERS at Temco Aircraft Corporation are using a unique V-block device to lay out reference points on horizontal pipe which they cut and assemble in jig-building. The V-block virtually guarantees accuracy in layout preparations for halving, quartering, or attaching metal pads to pipe of any diameter. In addition, the block saves layout time—about ¾ manhour per shift on the average.

Welders had found it difficult to maintain accuracy when making lengthwise cuts on long pieces of pipe. They could establish a center line mark on one end of the pipe; however, when they tried to mark a similar point at the pipe's other end, they had no means to insure that the two points, connected, would provide a straight line.

As shown in the accompanying illustration, the device developed to solve these problems consists basically of an aluminum V-block, 4½ in. wide. A 10-cent protractor is mounted on a plate attached at one end of the V-block. A movable metal pointer is fixed so that it sweeps across the face of the protractor, and a 2½-in. bubble is mounted so that it moves with the pointer. A prick punch is inserted at the point of the vee—in line with the 90-degree point on the protractor.

To establish a center line on hori-

Layout problems that normally complicate pipe-cutting are solved by this unique V-block. Equipped with a protractor, leveling bubble and prick punch, the block enables its user to lay out any precision reference point on horizontal pipe. Operator is shown preparing to mark a point some 17 degrees off the center line.

zontal pipe, the welder places his V-block on one end of the pipe, sets the pointer at 90 degrees on the protractor, and adjusts the block until the bubble is centered. He then taps the punch, which marks on the pipe one end of the center line. He repeats this operation at the other end of the pipe and then connects the points with a straightedge, if the pipe is short, or by popping a line, if the pipe is long.

If he wants to cut out a quarter-section of the pipe, lengthwise, the welder uses the line he has just drawn as one guide line. To obtain the other guide line, he moves the pointer on his V-block to zero or 180 degrees on the protractor. He then slides the block around the curvature of the pipe until the bubble again is centered, and taps the punch again. This procedure—repeated at the other end of the pipe — provides the two terminal points for the second guide line. The lines are exactly 90 degrees, or one-quarter of the pipe's circumference, apart. The same procedure is used to halve or otherwise section pipe lengthwise.

Another chore that the V-block simplifies is that of accurately positioning pads on jigs made of pipe. These flat metal pieces are used to position or support assemblies that will be built in the jigs. Often, they must be attached at a precise number of degrees off of horizontal. The operator can locate attach points for pads simply by centering his V-block bubble with the pointer registering the required number of degrees off the center line. A stroke on the punch marks where the pad should rest.

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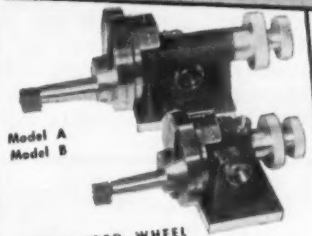

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Model B
Model C

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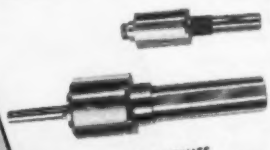
MODEL A—For grinders using wheels up to 20" dia MODEL B—For small model surface grinders with 7" max wheel dia MODEL C—Compound Dresser, will compensate for compound angles involved in grinding form tools.

SAMSON "Heavy-Duty" OFFSET BORING CHUCK—Has positive centering feature for drilling and milling operations. Complete accessories available.



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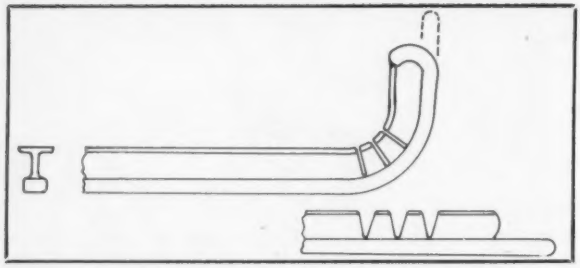

Sketch showing how scrap rail can be used to provide an attractive and sturdy protecting device for shop structures

Scrap Rail Makes Sturdy Protector

By B. Sharp

TO protect shop structures such as shop offices, vulnerable machine tools, building corners, loaded racks, and so on, from being damaged by power trucks, railings made of angle iron or channels are used frequently. Such railings, however, often do not provide the proper protection because of their inherent weakness against bending. On the other hand, rail as used for streetcars or railroads possesses a high section modulus, will resist impacts, and, at the same time, can be made into a railing of neat appearance. Such rail is often available at scrap prices.

To make a smooth bend, wedge-shaped sections can be removed by flame-cutting, as shown in the accompanying sketch. A portion near the end if cut away as shown permits the rail top to be curved around, thereby resulting in a smooth end section that has a neat appearance and prevents injuries.

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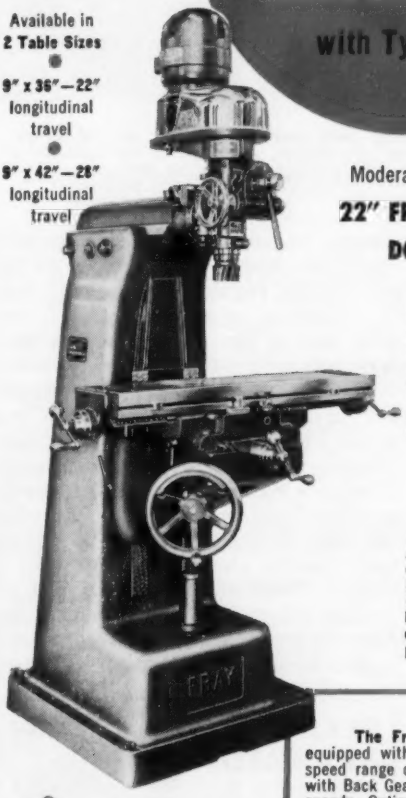

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Simple Methods for Speeding Up Four-Jaw Chucking Operations

By E. F. LEIRY
England

IN THIS article, the writer presents two simple methods for speeding up the performance of four-jaw chucking operations. Fig. 1 shows how the jaws of a four-jaw chuck can be quickly and easily reversed

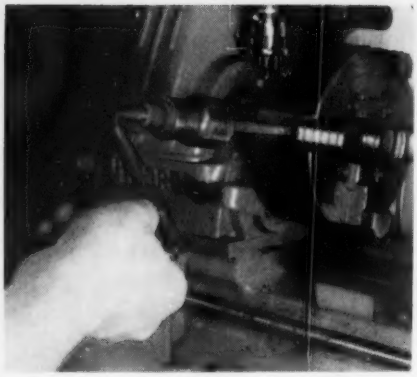

Fig. 1—Illustration showing how a piece of square section steel held in an ordinary carpenter's brace permits the jaws of a four-jaw chuck to be readily reversed.

using a piece of square section steel (equal in size to the square on the end of the regular chuck key) held in the chuck of an ordinary carpenter's brace. The square section steel need not be hardened since it is only used when the jaws are free and not gripping any work, with a result that it is not subjected to any heavy twisting strains. A sufficient length of square rod should extend from the chuck of the brace to accommodate the full length of the lathe chuck body. Lathe chucks having keys of over ½ inch square section are not readily adapted to the use of a carpenter's brace and, therefore, special crank handles can be formed simi-

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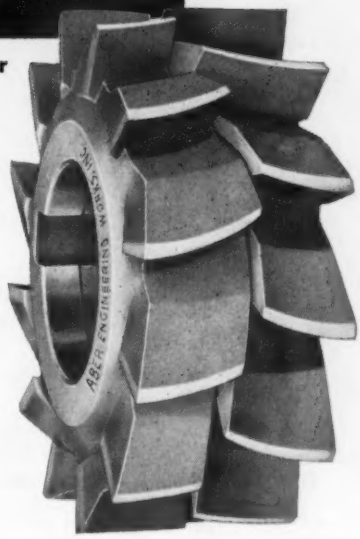

Objectional chatter marks from standard type cutters surprisingly resulted in increasing production from 4,000 to 20,000 pieces per grind

Eight months ago a manufacturer experienced difficulty in obtaining a smooth surface on a side milling operation while using standard type cutters.

Aber "Curved Tooth" right and left hand shear side milling cutters were recommended to eliminate chatter marks. NO THOUGHT WAS GIVEN TO INCREASING PRODUCTION.

The results proved outstanding — After eight months of continuous operation, without once removing the cutters from the machine, Aber "Curved Tooth" cutters produced 20,000 pieces against previous peak outputs ranging between 3,000 and 4,000. In addition the cutters are still producing pieces within specified tolerances and with a finish finer than that obtainable with NEW standard type cutters.

Here Are the Facts

OPERATION DATA

MACHINE: U. S. Multimiller

TOOL: Aber "Curved Tooth" right and left hand shear side milling cutter. 3"x⅝"x1¼"

MATERIAL: Bronze Turbine Blades.

COMPARATIVE PERFORMANCE

	ABER CUTTER	STANDARD CUTTERS
S.F.M. Speed:	400sfm	400sfm
Feed per Rev.:	16" per min.	12" per min.
Depth of Cut:	⅛"	⅛"
Pieces per Grind:	20,000 and still going strong	3,000 to 4,000 maximum

You too can profit by applying Aber "Curved Tooth" milling cutters for increased production and reduced rejections due to off-tolerance, unsatisfactory finish milling operations. Remember every Aber Tool has the exclusive, patented "Curved Tooth" design providing chatterless, smooth cutting action.

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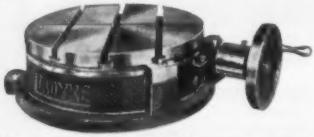

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lar in shape to the handles used for operating car jacks.

Another method for speeding up four-jaw chucking operations is illustrated in Fig. 2. In this case, lines are marked on the sides of the chuck jaws for the purpose of lining up the jaw steps with the concentric circles engraved in the face of the chuck body. These lines save considerable time in truing up work gripped in

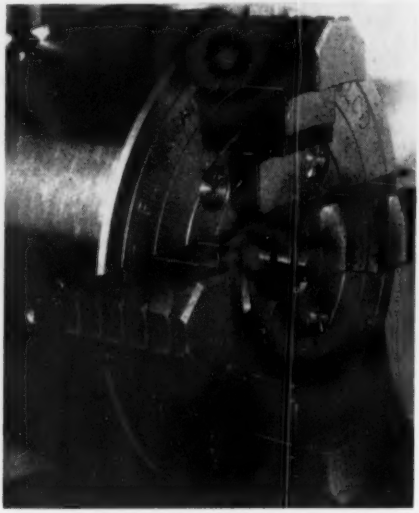

Fig. 2—Illustration showing how scribed lines on the sides of chuck jaws facilitate accurate chucking of workpieces in a four-jaw chuck

the chuck jaws, particularly when disc-shaped objects are to be held, since the jaws can be set to grip fairly concentrically before the work is inserted into the chuck. For convenience, lines are marked on both sides of the chuck jaws. In cases where jaws have sides which are ground to a high finish that makes it difficult to mark the surfaces with clearly visible lines, the sides of the jaws are painted with blue layout fluid so that clearly visible lines can be scribed therein. The chuck illustrated is treated in this manner. Alternative meth-

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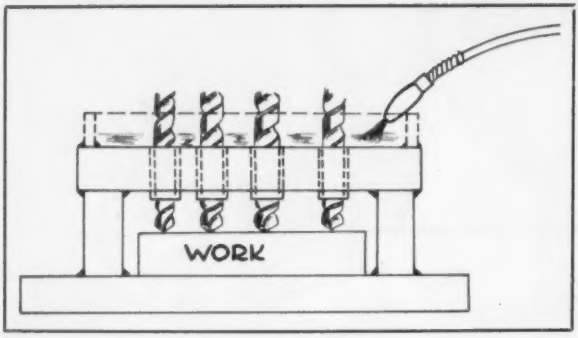

Sketch showing how coolant dam fastened to multiple-spindle drill dress jig assures sufficient coolant for each drill

ods of marked hardened jaw surfaces involve the use of a carbide-tipped scriber or electric etching pen.

Coolant Dam Prolongs Tool Life

By Alfred Palmer

IN multiple-spindle drill press work, it is of great importance to provide sufficient coolant fluid for each drill. If just one spout is provided on the machine, proper flow can be obtained by the addition of coolant dams to each drill jig. Simply weld or screw a closed band to the drill plate which will then act as a reservoir and permit equal coolant coverage for each drill, as shown in the accompanying sketch.

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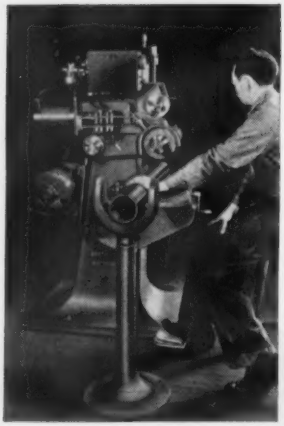

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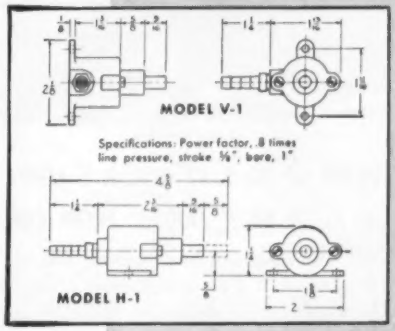

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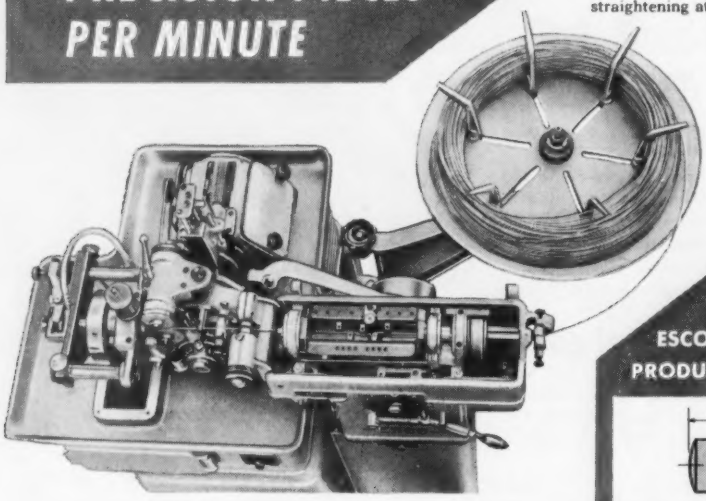

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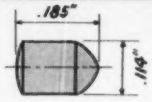
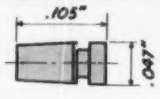
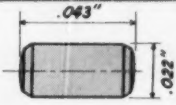


100/min.—brass



63/min.—nickel-silver



50/min.—nickel

10/min.—mild steel

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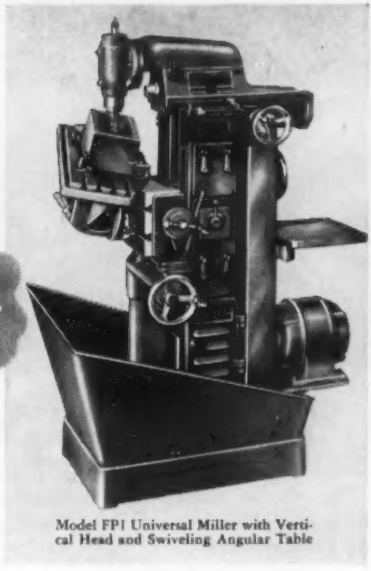

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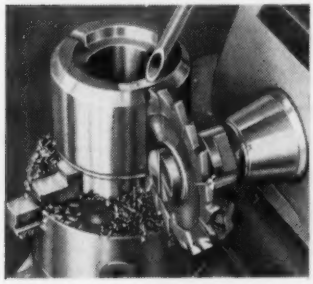
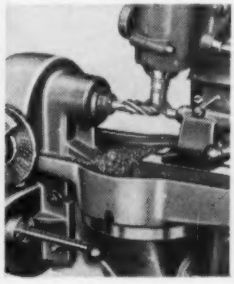
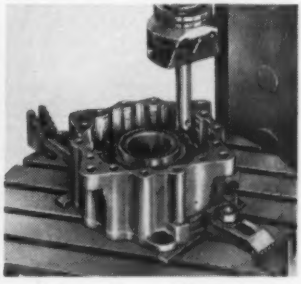
Slot milling using Universal Index Head



Milling flutes of a tapered cutter with Spiral Milling Attachment



Boring a barrel-type pump housing on the FP1 using the Universal Facing & Boring Head and Circular Table with Indexing Mechanism



See how the DECKEL Universal Miller can simplify your complex multiple machining operations. Write for complete catalog or ask that a Cosa engineer discuss with you the advantages of these practical machine tools.

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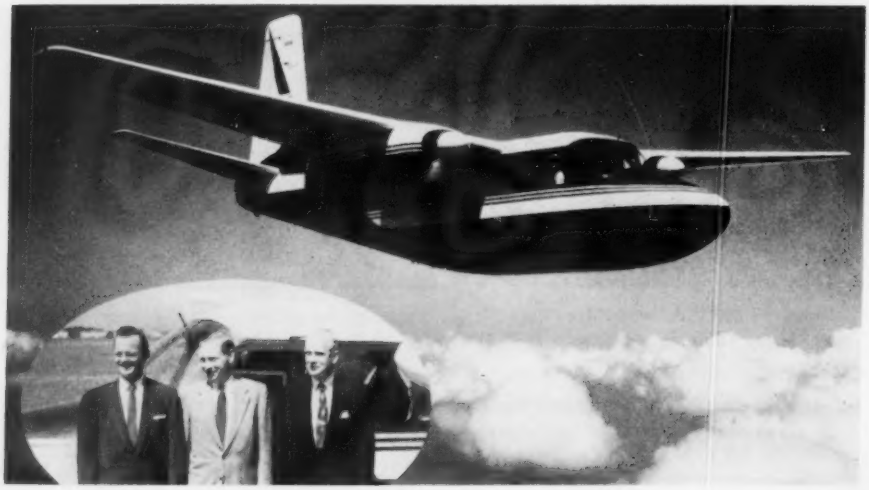
news of the industry

Cross Company Purchases Airplane for Sales and Service Personnel

The Cross Company, special machine tool builder, Detroit, Michigan, has given wings to its sales and service personnel by purchasing a two engine Aero-Commander airplane with a seating capacity for six persons and the pilot. The plane is now in service transporting members of the organization to points throughout the country.

According to Milton O. Cross, company president, the plane will enable Cross sales engineers to save time and spend longer periods in consultation with customers. At the same time, service calls and part deliveries will be speeded up. The plane will also be used to transport interested visitors to the Cross plant in Detroit.

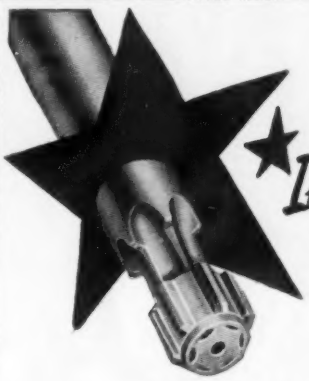
Cross two-engine Aero-Commander airplane in flight. Inset (left to right): A. J. MacLaren, sales manager; Robert B. Read, service manager; and Capt. R. G. Brubaker, pilot.



Slide-Lecture Program on Hydraulics

A four-color slide-lecture program designed to broaden the understanding of the operation of hydraulic components has been completed by The Denison Engineering Co., Columbus, Ohio. These slide lectures, which will be made available for use in colleges, engineering societies, company training programs, and so on, cover the following hydraulic components: axial piston pumps and motors, vane pump/motors, directional valves, surge damping valves, flow controls and hydrostatic valves. The program is designed to keep the engineer and designer up-to-date on the latest developments in fluid power.

From six to 15 four-color slides are used to describe the operation of the hydraulic units in this series. The number of slides is determined by the complexities of the unit. A typical slide-lecture is the one on the Denison 2,000 p.s.i. relief valve. Six slides are used to describe the operation of this valve. Slide One shows and describes the relief valve series; Slide Two explains the operating features; Slide Three is a quarter section cutaway which describes what makes the relief valve work; and Slide Four through Slide Six show what happens inside the valve when pressure is introduced. Data on the entire program or the slide-lecture on any component can be obtained by writing to Marion Burton, advertising manager, The Denison Engineering Co., 1236 Dublin Rd., Columbus, Ohio.



Star Performer In The Reamer Field

Staples

CARBIDE-TIPPED

SHELL TYPE EXPANSION REAMER*

For maximum tool life with minimum tool servicing, put this Staples Shell Type Expansion Reamer on the job. Tool is returned to original diameter simply by driving the shell up the tapered arbor. Tool can be expanded many times without a re-grind. To obtain a new tool, just order a new shell—a standard stock item.

Standardize on Staples Carbide-Tipped Circular Cutting Tools. You'll get longer tool life—greater accuracy—finer hole finish—and spend less time on tool servicing. Staples is the *quality* name in carbide tool production. You'll save money in the *long* run with Staples.

* Patented

THE STAPLES TOOL COMPANY, Cincinnati 25, Ohio

Distributors in Major Cities

Staples CARBIDE-TIPPED CUTTING TOOLS

A complete line of Circular Carbide Tipped Cutting Tools
Expansion Reamers Special Tools

Expert on Swiss Automatics to Make Lecture Tour in the United States

Fred Henzi, director of Andre Bechler, Ltd., Moutier, Switzerland, manufacturer of Swiss automatic screw machines, will make a lecture tour of the United States during October, November and December. Mr. Henzi will discuss the overall problems of automatic precision turning and will show which kind of pieces can be made best on Swiss automatics. The two-day lectures are free and will be addressed mainly toward engineers concerned with planning, methods and production.

The lecture tour will be more extensive than Mr. Henzi's previous visit to the U. S. in 1952. The tentative schedule is as follows: Los Angeles, the week of October 18; Chicago, the week of November 1; Detroit, the week of November 8; Cleveland, the week of November 8; Rochester, the week of November 15; Boston, the week of November 22; Philadelphia, the week of November 29; and New York, the week of December 6. For registration forms, write Bechler's U. S. representatives, the Cosa Corporation, at the Chrysler Building, New York 17, N. Y.

Fred Henzi

"IN-STOCK" SERVICE ON FAMOUS SPHINX BRAND MICRO-DRILLS

High speed drills for small holes. Sizes from .08 mm (.003") to 1.0 mm (.040") carried in stock, in increments of .01 mm (.0004").

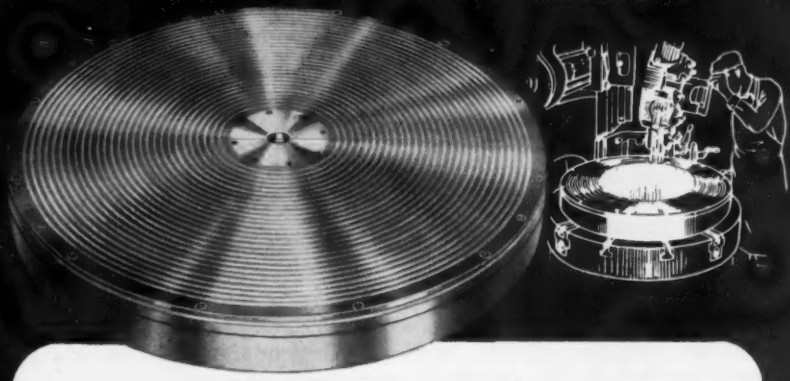
Sphinx brand micro-drills used throughout the world for many years for all fine watch and instrument work.

Send for Bulletin N listing sizes and prices of stock drill sizes and micro-drilling equipment.

These precision drills are available in two styles, flat pivot drills or spiral fluted drills. They are made with concentric oversize shanks. Because of their rigidity they are especially useful in all types of drilling equipment.

LEVIN ® Louis Levin & Son, Inc.
3610 South Broadway · Los Angeles 7, California

HARD-TO-HOLD PARTS
EASIER TO HOLD



Magna-Lock electro-magnetic ROTARY CHUCKS

On machines like vertical boring mills, rotary grinders and lathes, Magna-Lock Rotary Magnetic Chucks can solve tough holding problems.

Elimination of complicated fixtures substantially reduces set-up time, provides easier access to work piece.

Of rugged welded *all steel* construction, moisture-proof and shock-proof, Magna-Lock Rotarys range in size from 6¼" diameter face to 72" diameter. Sectional type for automatic loading – unloading can be furnished.

Hold your hard-to-hold parts with Magna-Lock . . . *first* to increase your machine's productivity.

Get details, DEPT. MM-104

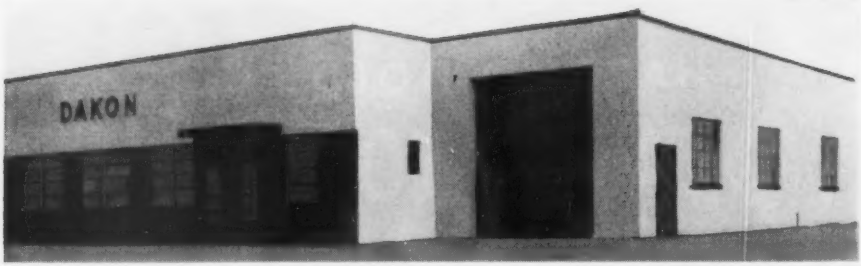
Request Magna-Lock as original equipment on your new machines.

Hanchett MAGNA-LOCK CORPORATION

Magnetic Chucks and Devices

Magna-Lock

BIG RAPIDS, MICHIGAN, U.S.A.



New, expanded quarters at Dakon Tool & Machine Co., Inc., New Hyde Park, Long Island, N. Y.

Dakon Moves to New Quarters

David Cohen, president, Dakon Tool & Machine Company, Inc., formerly located at 496 Broadway, Brooklyn, N. Y., has announced that the firm has moved to new and larger quarters in its own building at 1836 Gilford Ave., New Hyde Park, Long Island, N. Y. The modern, well lighted, one story building occupies 5,000 sq. ft. of a 10,000 sq. ft. lot. Ample room for parking, loading and unloading, as well as for future expansion, is provided. Transportation facilities are also excellent. In addition, the Dakon staff has been increased and new equipment installed to provide better service to customers. The new facilities, along with the adoption of assembly line procedures, are said to

Hartford
PRECISION BALLS
to your specifications
Chrome alloy balls for every requirement. Also stainless steel, bronze, Monel, K. Monel, aluminum, copper, glass, plastic, and drilled balls. Also special bearings and retainers. Just send your specifications to our Engineering Department.
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W. S. TURNER
446 NEW CENTER BLDG.
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605 W. WASHINGTON BLVD.
NEW YORK DISTRICT
NEWARK 2
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EXPORT OFFICE
R. A. RODRIGUEZ, INC.
55 W. 42nd ST., NEW YORK 18
LOS ANGELES 15
E. D. MALTBY CO.
1711 SOUTH FLOWER ST
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Hartford 6, Connecticut
WICHITA 1, KAN.
A. E. WERNER
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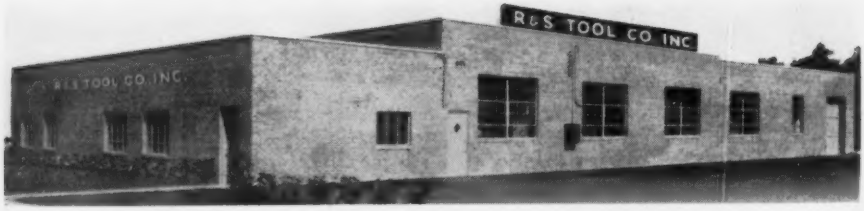
TAPS *by* CARD

The best way to gauge the value of a tap is to try it. You'll find Card taps live up to their reputation every time.

The CARD Quality

Completely stocked offices at Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York, San Francisco and Seattle
See your local Card distributor for prompt deliveries and helpful service

S. W. CARD MANUFACTURING CO., MANSFIELD, MASS. • DIVISION OF UNION TWIST DRILL CO. **TAPS • DIES • SCREW PLATES**



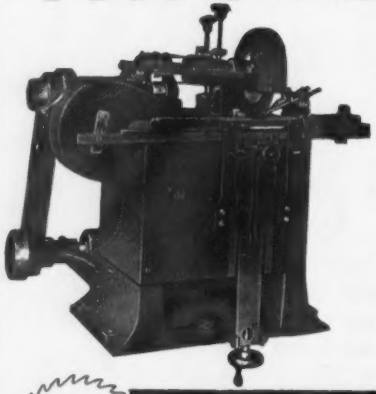
New, enlarged quarters of R & S Tool Co., Cleveland, Ohio

permit the company to double its volume of production. Dakon manufactures stainless steel whirlpool baths and precision live centers.

R & S Tool Completes Move to New Building

The completion of its move to new, enlarged quarters has been announced by R & S Tool Co., Cleveland 11, Ohio, manufacturer of tungsten carbide and high speed cutting tools. The new 8,500 sq. ft. building is located on the west side of Cleveland at 13100 Enterprise Avenue. Truman Longley, company president, states that the enlarged quarters and additional equipment will enable the firm to accommodate short production runs of special precision machining and grinding. The new program is in no way to interfere with the company's regular production of special and regular high speed production cutting tools. R & S Tool is an affiliate of the Truman E. Longley Co., Cleveland, which handles all R & S Tool sales.

PAYS FOR ITSELF!



by sharpening just one gross of hack saw blades

You can resharpen a gross of hack saw blades at least 6 times—actually saving you the price of this machine.

WARDWELL MODEL EC COMBINATION GRINDER is the only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

Write for Bulletin EC Today.

WARDWELL MANUFACTURING CO.
3803 Ridge Road, CLEVELAND 9, OHIO

Maker of largest line of saw and tool sharpening machines

INCREASES PRODUCTION...

LOWERS COSTS...

PAYS FOR ITSELF QUICKLY...

*The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials—fast, accurately, and at very low cost. Only $110.00**

Fixtures (illustrated) extra.

*Motor equipment:—1/4 H.P. 110 Volt AC 60 cycle, single phase, swivel motor mount and light—$36.00**

**All prices FOB Chicago.*

- ★ **MILLS SMALL PARTS MUCH FASTER.**
- ★ **DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT.** Replaces expensive production machinery—or releases it for other jobs.
- ★ **INEXPERIENCED HELP CAN OPERATE IT.** Safe, simple, fool-proof operation.
- ★ **NO MORE COSTLY SET-UP TIME. $110.00*** price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ **YOU GET A BETTER PRODUCT**—the result of ABSOLUTE ACCURACY.
- ★ **A LOSS BECOMES A PROFIT** when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- ★ **VERY LOW MAINTENANCE.**
- ★ **USED REGULARLY IN 1163 MANUFACTURING PLANTS** (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of *your* production problems.

Write today for further information.

H. B. ROUSE & COMPANY

2214 N. WAYNE AVE., CHICAGO 14

50 YEARS OF SERVICE TO INDUSTRY

Wash drawing of new plant of Tapmatic Corp., Costa Mesa, California

Tapmatic Corporation Announces Major Expansion

With the completion of its new building in Costa Mesa, California, Tapmatic Corporation announced a major expansion with full production facilities for the manufacture of its line of "Tapmatic" and "Tapmaster" tapping attachments. Occupying a ground area of 94,000 sq. ft., the first unit of the plant has been completed. This new unit is a 6,000 sq. ft., precast concrete, tilt-up structure which is now being equipped with full machining facilities. Tapmatic has been in operation for approximately a year in Banning, California, with Andrew Johnson as president and Eric S. Johnson as sales manager. The Johnsons were formerly owners of Mayville Die & Tool Co., Mayville, Wis., where they manufactured tools, dies, jigs and fixtures. Tapmatic Corporation plans to market its products nationally and is now in the process of qualifying distributors in principal cities.

Beverly THROATLESS SHEAR

Cut any Shape... STRAIGHT OR IRREGULAR

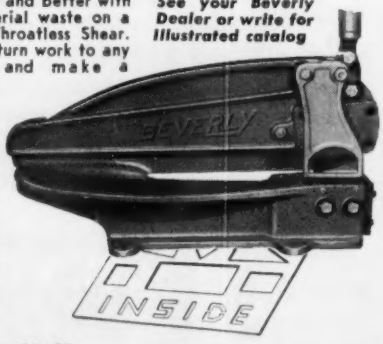
INSIDE SLOTTER

8" Reach—16 ga. cap. Makes inside slotting cutting faster, easier, cleaner. Punch and die arrangement of 5 blades assures accuracy, clean cutting action. Cuts 2½"x1/16" slot at one stroke. Throat design permits pivoting work at any point in stroke for special inside cuts. Note sample cuts at left.

Make any cut — curved, straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear. You can turn work to any position and make a clean cut as you go. Handles heavy gauges with ease — lighter metals without distortion. 4 models—capacitites 18 gauge to 3/16" mild. All shears equipped with High Carbon, High Chrome Blades.

See your Beverly Dealer or write for Illustrated catalog

B-3 with Ball Bearing Hold Down



BEVERLY SHEAR MFG. CO., 3000 W. 111th St., Chicago 43, Ill.

It's the built-in quality that counts Avey no. 1 PRODUCTION MACHINE

COLUMN OR BENCH TYPE
SPEEDS UP TO 12000 R. P. M.
12" SWING

A HIGH CLASS TOOL to meet the requirements for *Precision* and *Production Drilling*.
CAPACITY—From very small number size drills up to ½" in cast iron.
Built-in Work Light on all spindles.
Telescopic Spindle Guard.
Rack and Pinion operated Motor plate—easily adjustable for proper belt tension and speed changes.
Clock Spring fast acting spindle return.

Write for Bulletin

THE AVEY DRILLING MACHINE CO., Cincinnati 1, Ohio

HOGGSON BRAND
Since 1849

STEEL STAMPS
Letters & Figures

Letters and figures deep-cut in hardened, special formula steel assure clean impressions and long service. Faces are angled for added strength. Chamfered corners make it easy to locate the base. At your mill supply house or write for circulars.

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STEEL MARKING DIES

For product trademarking or identification. Any style of lettering, designs, pictures, developed from your sketch or print. Straight or reverse. For hand or press. Whenever you get calls for marking dies, write us for prompt service.

HOGGSON & PETTIS MFG. CO.

New Haven 7, Conn.

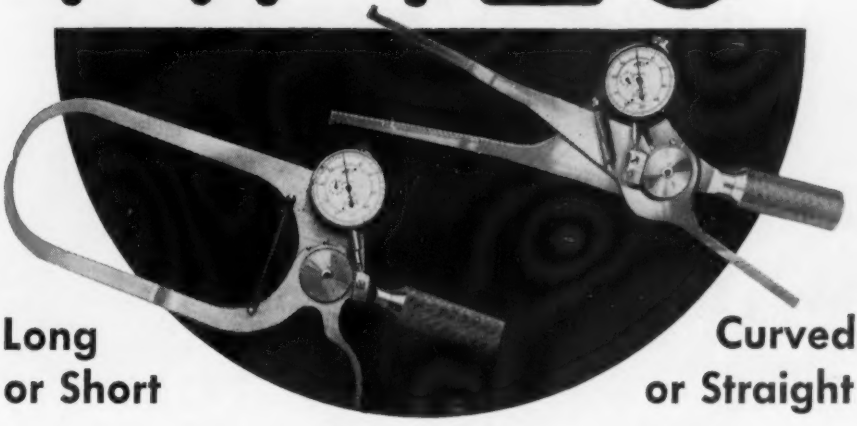
Giant Machinery Action Demonstrated By Miniature Grinders

Exact replicas of two grinding machines produced by Samuel C. Rogers & Co., Inc., Buffalo 11, N. Y., have been carefully designed and engineered to reproduce their regular production counterparts. These actual working models are made of steel and aluminum. Over 650 hours went into the extensive layout, design, rescaling and handmaking of the two machines.

Arthur F. Moul, president, Samuel C. Rogers & Co., Inc., Buffalo, N. Y., is shown standing behind two reproductions of industrial grinding equipment that are completely operative.

"Sammy," a reproduction of the multi-ton Rogers 220 Knife and Flat Face Grinder, has been scaled down from 17 ft. in length to 17 inches. Two 1/50-h. p. motors drive the machine — one drives the knife table and the other drives a 3-in. segmental grinding wheel. As on the larger machine, the knife bar can be tilted. The cross feed of the grinding head to the work is manipulated manually. A handmade rack in the table mechanism has eight teeth to the inch. The Bodine Electric Company contributed the small motors. Both the Manzel Company and

AMES



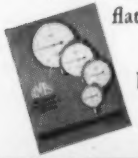
Long or Short

Curved or Straight

CALIPER GAUGES—Custom-built to fit your exact need.

Whether it's measuring the inside dimensions of a pipe, the wall thickness of a casting, the outside dimensions of a rocket—Ames can build the caliper gauge that fills your requirements.

Ames caliper gauges are made of carefully-finished heavy gauge steel and are equipped with an Ames exclusive: a chordal error correcting cam that assures accurate readings. Ames calipers are available with contacts of various shapes—ball, flat or pointed—made of carbide, hardened steel, or sapphire.



Write for your free copy of Ames catalog

Your measuring problems may involve a caliper gauge. If so, send it to Ames—for a quick, profitable solution.

Representatives in principal cities.

B. C. AMES CO.

29 Ames Street
Waltham 54, Mass.

Mfgr. of Micrometer Dial Gauges • Micrometer Dial Indicators

The Ruthman Machinery Company made models of their five-point oiler and gusher-type pump, respectively. The model of the No. 220 machine weighs only 32 pounds.

"Roger," a circular knife and slitter grinder designed after the Rogers CC-4 machine, has been scaled down from 4 ft. in height to 12 inches. There are two 1/75-h.p. motors on this model—one to drive the grinding wheel and the other to spin the circular knife. Three accurately machined ways with feed screws of some 20 threads per inch allow work to be set up and actually ground on this model. "Roger" weighs approximately 12 pounds.

18th Annual Time and Motion Study and Management Clinic

More than 2,000 production executives and methods engineers are expected to attend the 18th Annual Time and Motion Study and Management Clinic sponsored by the Industrial Management Society and scheduled for November 10, 11 and 12, 1954, at the Hotel Sherman in Chicago. Thirty leading authorities from management, labor and industry will discuss the latest developments in the fields of time study, motion economy, job evaluation, methods, plant layout, incentives and human relations. In addition to the technical sessions, an industrial exhibit will be held, featuring new products, processes and services applicable to the industrial engineering field. A feature of the event

It's the wHOLE Truth.....
Double eccentric type for irregular spacing
Universal joint with slip spindle fixed locating plate
Single eccentric type for equally spaced holes on bolt circles
US HEADS
Machine tool men "in the know" have long acclaimed the "US" Adjustable Multiple Spindle Drill Heads with their quick-change universal joint assemblies. They are built for continuous use, with full anti-friction bearing construction for high capacity thrust loads. The universal joint adjustable multiple spindle type is suitable for any sensitive drilling machine. Joints are self-lubricating.
The single eccentric type is used for equally spaced holes on bolt circles.
The new double eccentric AdjUStafix, two to eight spindles, permits spindles to be located in non-symmetrical patterns. It eliminates expensive change in set-up.
Write for details on any type of universal joint adjustable head. Ask also about our totally enclosed gear-driven adjustable, fixed center, or individual lead screw tapping heads.
UNITED STATES DRILL HEAD CO., 616-618 Burns St., Cincinnati 4, Ohio

And Bay State Quality is available from the nearby shelves of your industrial supply distributors. Several special treatments are furnished at no extra charge, most important of which is the courteous treatment of customers.

BAY STATE TAPS

BAY STATE TAP & DIE COMPANY | MANSFIELD, MASS.

Reid Tool Supply Company's new office and warehouse building, Muskegon, Michigan

will be the Annual Methods Improvement Competition, with awards to companies and colleges for outstanding advances in industrial engineering techniques and applications.

Reid Tool Supply Company Moves into New Office and Warehouse Building

Reid Tool Suply Company has moved into a new office and warehouse building located at 332 Delano Street in Muskegon, Michigan. The company supplies toolroom accessories and components to manufacturers all over the country.

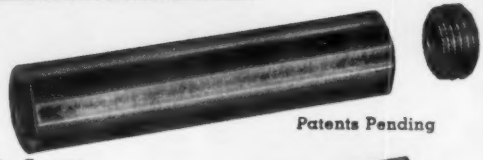
Motch & Merryweather Celebrates 50th Anniversary

September, 1954, marked the 50th anniversary of the founding of The Motch & Merryweather Machinery Co., Cleveland, Ohio. The founders, George E. Merryweather, Edwin R.

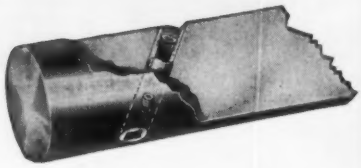
How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.



Patents Pending



SLEEVES MADE IN FOLLOWING SIZES:
3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

STURDY BROACHING SERVICE

23516 TELEGRAPH ROAD DETROIT 19, MICH.

Write for Literature

New lightweight grinder is a HEAVYWEIGHT WORKER!

Put a new 7 pound air-powered CP Vertical Grinder in an operator's hands and he'll remove the same amount of metal he formerly did with a 10 pound tool! It's the CP-3190 . . . designed for driving cup wire brushes and grinding wheels, sanding discs, and cut-off wheels! Here are the features that tell why the CP-3190 takes a beating, yet is seldom down for repairs:

- **Splined type floating rotor prevents end-plate wear from wheel thrust.**
- **Continuous lubrication afforded by large oil reservoir and built-in lubricator.**
- **Safety governor valve cuts off air supply in the event of possible governor failure.**

Available in speeds to 8000 RPM, in capacities capable of handling 6" cup wheels, and 7" and 9" disc sanding pads and cut-off wheels.

Chicago Pneumatic *8 East 44th Street, New York 17, N. Y.*

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Motch and Stanley Motch, were all graduates of Massachusetts Institute of Technology, and served their apprenticeships in eastern metalworking plants. In 1904 they formed a company with headquarters in Cleveland to serve as distributors of machine tools, representing leading machine tool builders in the Ohio and eastern Michigan area. This area was later expanded to include western Pennsylvania, Kentucky and part of Maryland, and branch offices were established in Detroit, Pittsburgh, Cincinnati and Dayton. The original office, with a staff of four employees, located at 711 Lakeside Ave., N. W., Cleveland, Ohio, was moved in 1923 to the Penton Building, which still serves as company headquarters. The employee roster has grown to 500, including all office, sales and factory personnel.

The company now operates six divisions, the largest of which is the Machine Tool Distributor Division, with 35 sales engineers covering the territory from Cleveland and the four branch offices. The Cutting Tool Distributor Division has 20 sales engineers covering the same area, selling a line of cutting tools and machine tool accessories. The company's plant at 888 E. 70th St., Cleveland, houses the Machinery Manufacturing Division, which builds a line of diversified types of machine tools under the Motch & Merryweather name. The company also has a plant at 1250 E. 222nd St., Euclid, which houses the Used Machinery and Rebuilding Divi-

standardize on standard

use it

anywhere

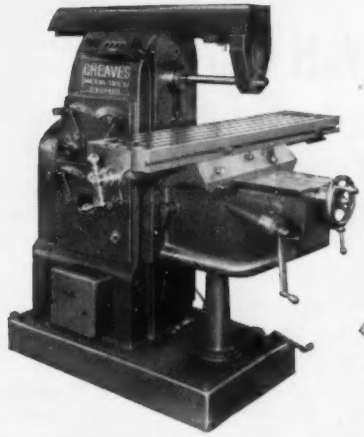
HALLOWELL® CARRY-TOOL

It's the most convenient carrier in the shop. Use it on assembly lines, at machines, in the toolroom. Use it for inspection, stockroom, maintenance, and mounting small tools. Drawers have ball bearing rollers and padlock attachments. Stocked and sold by industrial distributors. Write for literature. STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION

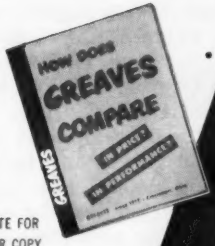
SPS

JENKINTOWN PENNSYLVANIA



COMPARE

. . . PRICE! . . . FEATURES! . . . PERFORMANCE!



GREAVES

. . . WILL BE YOUR CHOICE!

"The Most Mill For The Least Money"

Now you can make the same painstaking comparison that sold and satisfied leading plants on Greaves 2H plain and universal milling machines. A free chart cross-compares 22 significant specifications . . . including speeds, feeds, power and capacity . . . on each of the eight leading milling machines.

Make your own comparison . . . in your office, out on the factory floor or right out of our competitors' catalogs . . . we're convinced you'll find that Greaves is your best buy!

WRITE FOR YOUR COPY OF THIS EYE-OPENING COMPARISON CHART

ASK ABOUT OUR TOOL LEASE AND DEFERRED PAYMENT PLANS

GREAVES MACHINE TOOL COMPANY, 2700 EASTERN AVE., CINCINNATI 2, OHIO

Please send me: ☐ The COMPARISON CHART.
☐ Tool Lease and Deferred Payment Plans.

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I'm the W.H.O.* of
WHO'S WHO
in the precision screw machine products field
Making the finest
SET SCREWS CAP SCREWS
COUPLING BOLTS
MILLED STUDS
. . . our specialty
*Wm. H. Ottemiller Co.
YORK, PENNA.
Ottemiller products are sold through Mill Supply Houses and Industrial Distributors.

sion and the Cutting Tool Manufacturing Division. Entering upon a program of diversification, the company last year established the Triple-M Products Division in Gates Mills to produce and merchandise its own design multi-purpose power garden tool.

The company, now in the second generation, carries on with the following officers; E. Franklin Motch, president and treasurer; George E. Merryweather, vice president and secretary; Clare R. Kubik, vice president, administration; Henry A. Murton, assistant treasurer; W. F. Edwards, assistant secretary; Milton R. Kubik, controller; and W. J. Chamberlain, director of sales.

Buckeye Tools Dedicates New Plant and Offices

The invention of the rotary air tool some 35 years ago was brought into sharp focus once again at the dedication of the new Buckeye Tools Corporation plant in Dayton, Ohio. W. W. Price, who founded Buckeye Tools in 1920, pioneered the development of the first successful rotary air tools, opening up a completely new approach to air tool design and the use of compressed air. The new Buckeye Tools manufacturing plant and offices occupy 25,000 sq. ft. of floor space in a modern, single-story structure. Planned to incorporate every proved idea that could contribute to operating efficiency, the plant has been described as one of the most complete and functionally perfect plants of its type.

Dedication ceremonies, attended by an estimated 2,000 persons, featured brief talks by A. G. Lauzon, president; Hal O. Gummere, vice-president and general manager; Frank Pfeiffer, Dayton Chamber of Commerce; Brig. Gen. Clyde H. Mitchell; and others. The customary ribbon-cutting ceremony was given a novel twist through

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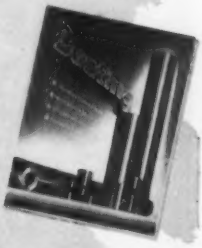
the information you want!

YOUR industrial distributor can tell you many ways in which you can save money by using Bunting Bronze Bearings and Bars and the other material and equipment items he sells.

He has selected each of the countless things in his stocks after careful study and comparison, seeking those which will do the most for you.

YOUR BUNTING distributor is the leading industrial distributor, or a stock-carrying specialist in certain industrial items. With money-saving convenience, he can supply hundreds of different sizes of completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars.

Ask him for a Bunting Catalog which gives complete dimensional and technical data.



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BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS

The Bunting Brass & Bronze Company • Toledo 1, Ohio • Branches in Principal Cities • Distributors Everywhere

(Left to right) Earl Hamilton, secretary; A. G. Lauzon, president; Hal Gummere, vice president and general manager; and E. E. Reeves, treasurer, are shown cutting metal ribbon with goldplated Buckeye shear at the dedication of the new plant of Buckeye Tools Corp., Dayton, Ohio.

the use of a metal ribbon which was neatly and quickly cut with a standard production model Buckeye shear which was gold-plated especially for the occasion.

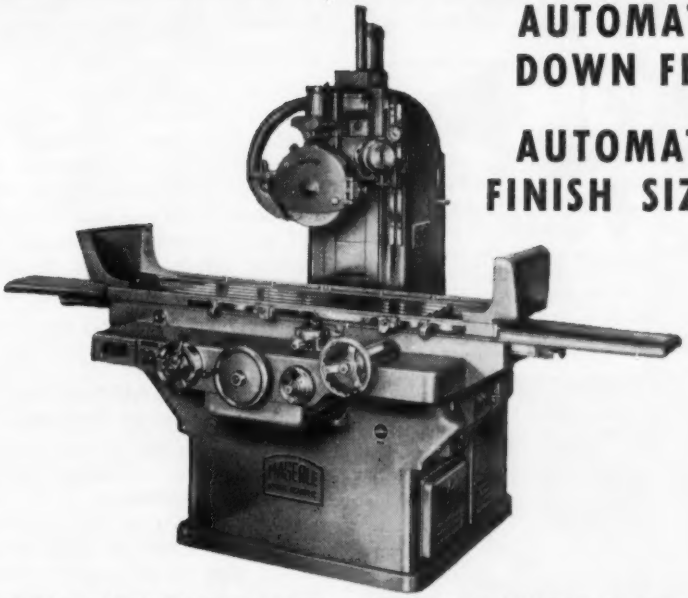
Still another innovation was the Open House held on the day following the official dedication. Invitations were extended to residents of the community in which the new Buckeye Tools plant was built. Using a "Hi Neighbor" theme, the entire community was invited to visit the company's plant and offices.

Invitations were delivered personally by plant personnel and an estimated 200 people toured the plant and enjoyed a buffet luncheon.

MÄGERLE (SWISS) HYDRAULIC SURFACE GRINDERS

AUTOMATIC DOWN FEED

AUTOMATIC FINISH SIZING



- A work measuring instrument shows the difference between work size and required final size during operation.
- The automatic feeding and sizing is powered by a separate electrical unit.
- The built in diamond wheel dresser automatically resets the final sizing mechanism for wheel wear.
- The machine requires no attendance during the grinding operation.
- Finishes within .0002 are secured on repeated chuck loadings automatically.
- Rapid traverse is provided for both head and cross-slide.
- Furnished with heavy duty cartridge spindle assembly.
- Available with infinitely variable grinding wheel speed.
- Extremely rugged construction and very easy to operate.
- Available in 2 foot, 3 foot and 4 foot models.

Write for our eight page illustrated brochure.

PELLOW MACHINE CO.

13500 FOLEY AVENUE • DETROIT 27, MICHIGAN

Special Die-Cut Washer Service

Dayton Rogers Mfg. Co., Minneapolis 7, Minn., has announced a custom-made special die cut washer service that is contract metal stamping work at which tool costs are at a minimum for short runs. The company is able to stamp out any type of special custom-made sheet metal washers from practically any material that can be stamped. Various types of thrust washers, with special o.d's and i.d.'s from such materials as bronze, bakelite, brass and any type of alloy sheet steel can be produced from sizes of ⅛ to 20 in., with maximum blanking pressure of 295 tons. Under this method, concentricity is said to be assured, and in a number of cases universal tooling can be applied, reducing the production costs of tooling to a minimum.

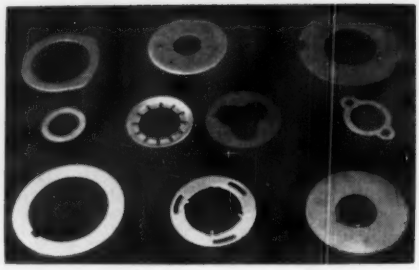


Illustration showing typical Dayton Rogers special die-cut washers

OK
T-slot Bolts
The world's best . . . one-piece, drop-forged—not welded—of mild carbon steel, heat-treated, with head accurately milled for standard tables on lathes, planers, boring mills, milling machines. Integral washer and nut. Sizes: up to 30". Typical direct prices for 10" lengths: ½—$1.36; ⅝—$1.36; ¾—$1.58; ⅞—$1.89. Write for price list.
THE O K TOOL COMPANY, INC., Milford 4, N. H.

DoALL Single Point Carbide Tools, Tips and Holders
• Finest, controlled quality sintered carbide
• Specific grades of carbides to meet every need
• All sizes, shapes
Call DoALL
—consult your classified phone directory for nearest DoALL Service Store that stocks cutting tools, gages, supplies—or Write
The DoALL Co.
Des Plaines, Ill.
DoALL Hefti-Cut Adjustable Tool with DoALL Preformed Carbide Blank
21

Verson Allsteel Press Announces Expansion

Verson Allsteel Press Company has announced the breaking of ground for a $1,500,000 addition to its plant facilities at 93rd Street and Kenwood Avenue in Chicago. This is the most recent and largest in a series of expansion moves that started in 1946. On completion it will bring Verson facilities to a point where they are

EISLER JIG BORING
CAM MILLING
A SPECIALIZED CAM MILLING SERVICE... JIG BORING... SPOT WELDING... CONTRACT PRODUCTION ...EXPERIMENTAL DEVELOPMENT
EISLER ENGINEERING CO., Inc.
734 So. 13th St. Newark 3, N. J.

You'll Cut Faster and Cut Costs with VICTOR BLADES

The secret is simply in selecting the *right* Victor blade for the job you have to do, and one of these four *is* the right one—

Victor "Moly"® High Speed Steel—Challenges all comparison as to economy and performance.

Victor "Molyflex"® High Speed Steel—Cuts like a genuine "Moly" but is so flexible it cannot be broken in use.

Victor High Speed Steel—The power blade that's unexcelled for fast cutting and durability.

Victor Unbreakable High Speed Steel—Absolutely shatterproof and unbreakable when in use. Fast cutting, flexible, long-lasting.

Your Victor Distributor Can Guide Your Choice

Ask him for the Victor Metal Cutting Booklet—a concise guide to blade selection for hand, power and bandsaw work. Depend on him for quick delivery of the *right* Victor blade from local stock. Use him as your source of supply for hundreds of the other items you need to keep your production uninterrupted.

1021

Sold Only Through Recognized Distributors

VICTOR

SAW WORKS, INC., MIDDLETOWN, N. Y., U. S. A.

Makers of Hand and Power Hack Saw Blades, Frames and Metal and Wood Cutting Band Saw Blades.

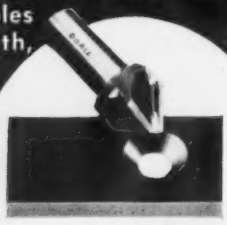
Drawing of $1,500,000 addition to plant of Verson Allsteel Press Co., Chicago, Illinois

six times as great as eight years ago. The new building, which will measure 90 by 540 ft., will house the Fabricating Division with facilities for producing weldments for the Verson line of stamping presses and other heavy machinery. Two 50-ton and two 15-ton cranes will be employed in the new building. For heavy bending and straightening, a 2,000-ton, 24-ft. press

DoALL CHATTER FREE COUNTERSINKS

...produce holes with a smooth, valve-seat appearance

New off-center flute design. Shears metal—does not gouge. Provides faster, more accurate cutting. Lasts longer. Available in H. S. Steel.



Call DoALL

see classified phone directory for nearest DoALL Service-Store—complete stock of gages, cutting tools, supplies.

Or Write:

The DoALL Co.

Des Plaines, Ill.

Sets available in 60°, 82°, 90°, 100°, 120°, angles

25

Does jobs no drill can do! *up to 10 Times Faster than Boring!*

NEW Clark "HOLE-MAKER"

Totally new—maximum rigidity, no chatter! Roughs or finishes holes to exact size in FORGINGS, CASTINGS, BOILER PLATE, THIN STOCK, TUBING; CROWNED, CYLINDRICAL AND FLAT SURFACES. One of 3 blades is *always* in the cut on odd work shapes—*smooth action even on intermittent cuts!* Use new HOLE-MAKERS in radial drills, drill presses, turret lathes, portable electric or pneumatic drills, etc. Excellent for trepanning and rough boring I.D.'s in Tubing, Castings, etc...a real production tool!

Holes can't drift, spindle can't deflect—it's piloted 2 ways!

Cuts steels, plastics, transite, non ferrous metals, stainless steel, etc!

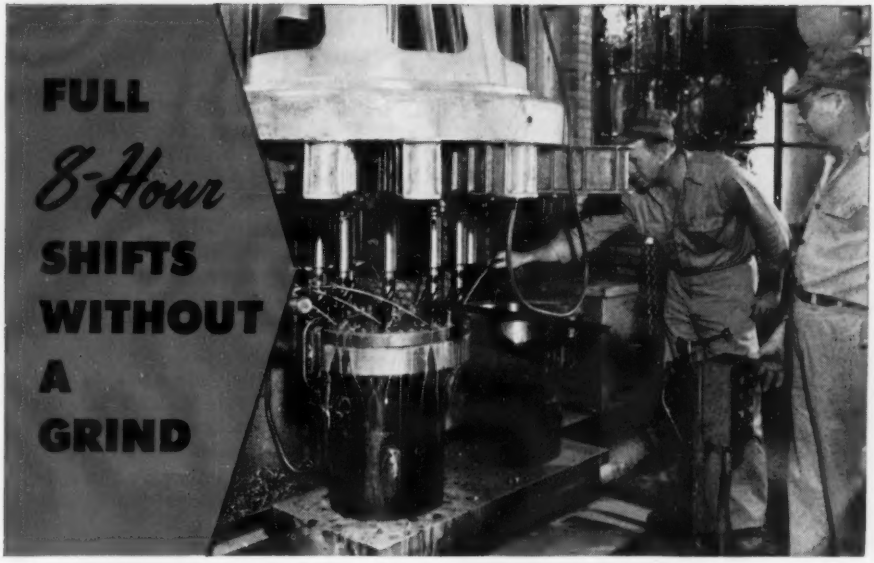
5 ADJUSTABLE SIZES: Specify Straight Shank or M.T. 2. 3. 4. Other tapers on order

Models:	102	203	304	405	506
Capacity:	1" to 2"	2" to 3"	3" to 4"	4" to 5"	5" to 6"

Order from your dealer or write for catalog!

ROBERT H. CLARK COMPANY

9330 Santa Monica Blvd., Beverly Hills, Calif.



These standard W & B high speed drills keep going for a full eight hours on each grinding—no shut-downs during shifts for resharpening or replacement of dull drills for this manufacturer of oil and gas well head equipment.

Casing heads are alloy steel having a Brinell hardness of 185-260. Drilling of bolt holes in casing head flange is done on a 16 spindle "Hole Hog." Operated at 126 R.P.M. and with a .015" feed per revolution, the high speed W & B drills quickly and efficiently complete the drilling of twenty 1½" diameter holes 3" deep in each flange.

This example of unusual drill durability and efficiency is indicative of the high performance you, too, can have by specifying W & B for your drilling operations.

W&B
DRILLS
REAMERS
COUNTERBORES
COUNTERSINKS
CARBIDE TOOLS
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SPECIAL TOOLS
"Makers Of Fine Tools Since 1868"

YOUR INDUSTRIAL DISTRIBUTOR
Can Give You Quick Service
On Whitman & Barnes Tools.
Contact Him Today!

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DoALL 2" Utility Monolight
. . . provides featherweight portability
• Checks surface flatness in millionths
• Ideal for use at production machines
• Perfect for roving inspectors
• Detachable head
HEAD SWIVELS 360°
Call DoALL — consult your classified phone directory for nearest DoALL Sales-Service Store stocking cutting tools, gages, supplies—or Write
DoALL OPTICAL FLATS
SQUARE
ROUND
ALL SIZES
DoALL also has 5" and 20" Monolights
The DoALL Co.
Des Plaines, Ill.
29

brake will be available. In addition, there will be a complete complement of large line-up tables, positioners and assembly pits.

The building itself will be of steel girder construction with brick and aluminum sidewall. The aluminum sidewall will be of the new "pigskin grain" to eliminate the blinding glare that often reflects from flat rolled aluminum panels. The roof will be of steel decking. In addition to expanding Verson's facilities for producing weldments for their own use and on a contract basis, the new plant will also free the machine shop to handle a greater amount of contract heavy gear cutting and machining. The new plant is scheduled for completion sometime in November and is expected to be in full scale operation by the end of the year.

A.M.T.D.A. 30th Annual Meeting

Senator Ralph E. Flanders of Vermont, a veteran leader of the machine tool industry, will address the 30th annual meeting of the American Machine Tool Distributors' Association in Cincinnati, Ohio, on October 19. Other speakers at the two-day convention, to be held at the Sheraton-Gibson Hotel, October 19 and 20, include Ralph E. Cross, deputy administrator of the Commerce Department's Business and Defense Services Administration; H. L. Tigges, president of the National Machine Tool Builders' Association; Tell Berna, general manager of N.M.T.B.A.; Dr. William W. Gilbert, consultant on machinability, General Electric Co., Schenectady; Charles Clark, The Cincinnati Milling Machine Company; John M. Riordan, chairman of the Riordan Machinery Company, Detroit; and Burnham Finney, editor of the "American Machinist."

Senator Flanders, the association noted, will bring to the convention

Cooley ELECTRIC HEAT TREATING FURNACES

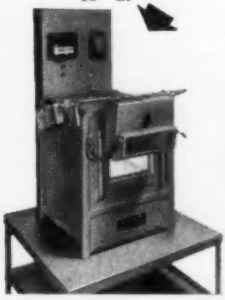
31 MODELS—A Complete Source of Small Heat Treating Furnaces

Cooley Heat Treating Furnaces are used for heat treating operations from 300° F. to 2500° F.

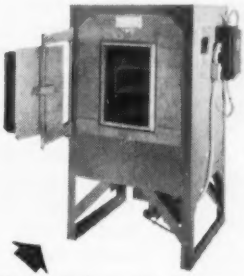
A special Cooley feature is a package unit comprised of furnace and integrally wired control panel, incorporating pyrometer, line switch and fuses—all completely factory wired.

Indicating controlling Pyrometers are available with all Cooley Furnaces.

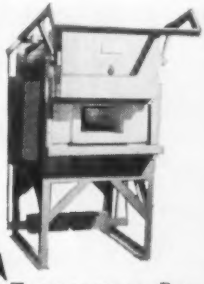
Bench Type — *For tools and small parts — to 2000°F* 14 models and sizes to 10″ w x 8″ h x 18″ d.



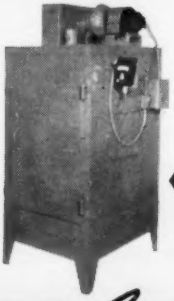
Industrial Box Furnace — *General heat treating — to 2000°F* 4 models and sizes to 15″ w x 12″ h x 30″ d.



Recirculating Air Draw — *Box type for controlled heating to 1250°F* — steel tempering, glass annealing, etc. 5 models —sizes to 24″w x 15″h x 48″d.



High Temperature Box Furnace — *For high speed steel treating to 2500°F* — 3 models and sizes to 12″w x 8″h x 24″d.



Recirculating Ovens — *for drying, finishing and industrial processing to 600°F*—5 models and sizes to 36″w x 36″d x 60″h.

Write for Catalog and Complete Details

Cooley ELECTRIC MFG. CORP.
34 SOUTH SHELBY STREET
INDIANAPOLIS 7, INDIANA

two score years of intimate contact with the machine tool industry. At the time of his election to the Senate in 1946, Mr. Flanders was president of the Bryant Chucking Grinder Company and president and chairman of the board of the Jones & Lamson Machine Company. He has also been president of the National Machine Tool Builders' Association and of the American Society of Mechanical Engineers. He administered machine tool priority allocations for the government after the outbreak of World War II and served on the Business Advisory Council of the Department of Commerce.

Thomas R. Rudel, president of A.M.T.D.A. and president of Rudel Machinery Co., Inc., New York, has announced that invitations have been sent to all members of the N.M.T.B.A. to have two company representatives attend the meeting and a reception and dinner party on October 19 as guests of A.M.T.D.A.

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Two styles. No. 2 with fibre back, No. 3 transparent both sides. Non-inflammable acetate windows. Special style or size to order.

Write for details.

WADE INSTRUMENT COMPANY

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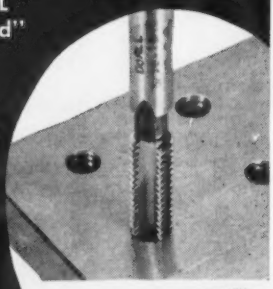
D. H. Prutton Machinery Company Changes Name to Prutton Corporation

Because of new machinery developments and a major expansion program, D. H. Prutton Machinery Company, manufacturer of thread rolling and tapping equipment, has changed its name to Prutton Corporation. The company, with plant and offices at 5295 W. 130th St., Cleveland, Ohio, has also announced that D. H. Prutton has become board chairman and Howard D. Prutton has succeeded him as president of the reorganized corporation. H. D. Prutton is directing all activities of the corporation, including a new customer service department formed to provide prompt engineering service on all Prutton machinery in the field.

For PRODUCTION TAPPING AT ITS BEST

Use DoALL "Engineered" Taps

- Complete stocks
- All kinds . . . all sizes
- High speed steel
- *Special* taps for special needs



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see classified directory for nearest DoALL Service-Store carrying complete stocks cutting tools, gages, supplies.

Guaranteed

None Finer

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CAMS

MADE TO YOUR SPECIFICATIONS

— Except Screw Machine Cams —

Design Assistance Offered

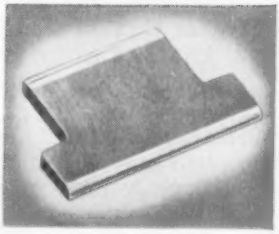
KIDDE PRECISION TOOL CORP.

37 Farrand St. Bloomfield, N. J.

Why wait?
CUT YOUR COSTS NOW!

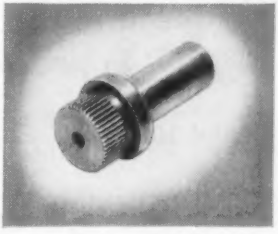
let the leading manufacturer of broaching equipment show you how to lower your break-even costs.

TEN TIMES FASTER than previous methods—broaching top and bottom radii on these automatic transmission reverse band anchors is helping one manufacturer lower the break-even costs. The broached part is not only more accurate, but thousands of the anchors are being machined between broach sharpenings.



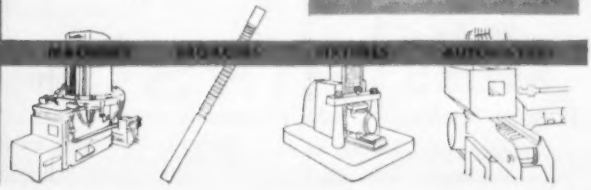
THIRTY TIMES FASTER than milling—broaching the intricate shapes of these copper breaker points has meant lower costs. Seven pieces are broached at a time using only two sets of Colonial broaches. 75,000 breaker points are completed before it is necessary to sharpen the broaches.

TWENTY TIMES FASTER than other methods—serrations on this shaft are cut with a button broach in a single pass. Hundreds of other applications on file at Colonial attest to the tremendous cost-cutting potential of "Unified Broaching." Send us prints of your parts—we'll show you how to cut costs.



Unified Broaching

COLONIAL



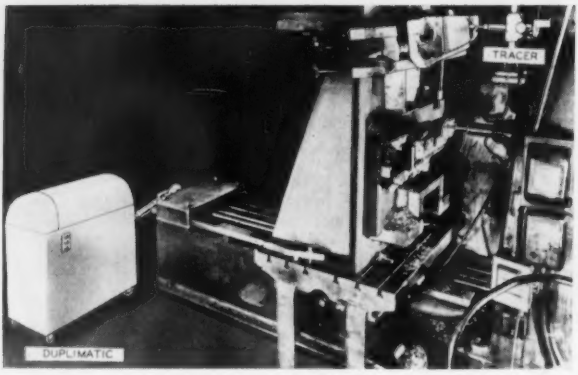


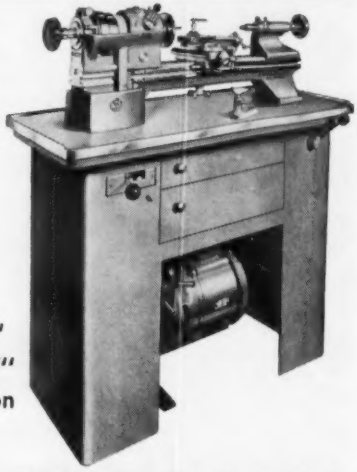
Illustration showing typical "Duplimatic" installation

Tracer Control Company Purchases Duplicator from Lodge & Shipley

Tracer Control Co., Hazel Park, Mich., has announced the purchase of a contour machining duplicator from The Lodge & Shipley Co., Cincinnati 25, Ohio. Formerly national distributors of the duplicator, Tracer Control will now manufacture the device, designated as the "Duplimatic," and will sell it nationally through machinery dealers. The Duplimatic, electrically controlled and operated by hydraulic motors, attaches to practically any machine tool and controls movements of the machine automatically. According to the manufacturer, the unit is capable of reproducing dies and production parts from plaster models and metal templates.

Tracer Control has incorporated several improvements in the design of the unit, making it completely flexible.

SV 102
SCHAUBLIN
toolmakers' lathes
for those who
demand the ultimate
in precision



The SV 102 { Height of Centers..... 4"
Distance Between Centers 17"

For Complete Information
Write Dept. MS

Largest Selection of SWISS Precision Machine Tools in U.S.

HIRSCHMANN
CARL HIRSCHMANN COMPANY, INC., 30 Park Avenue, Manhasset, N. Y.
BRANCHES: CHICAGO, DETROIT, LOS ANGELES
HOME OFFICE REPRESENTATIVES IN PRINCIPAL CITIES

Looking for Ways to Cut Costs?

Let These IDEAL MONEY-SAVERS HELP YOU

MULTI DUTY MODEL
Has interchangeable male, female and pipe points for all centered and uncentered work. Morse tapers 1 to 5, also straight.

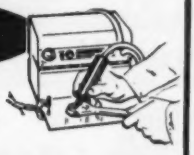
HEAVY DUTY MODEL
Extra ruggedly built, to withstand extreme pressure of turning jobs up to 22,000 lbs. Eccentricity tolerance is less than .0002". Morse tapers 4, 5, 6 and 7.

LIVE CENTERS

NEW "UNIVERSAL" MODEL
Proven Accuracy to PLUS or MINUS .0001".
Extra high load capacity for a wide range of work. High precision, pre-loaded roller bearings—point ground in its own bearings after assembly — and new type double seal that positively keeps dirt out and grease in, insure long life and continuous accuracy. Morse tapers 2, 3, 4 and 5 for work up to 5630 lbs.

IDEAL LIVE CENTERS ARE ALSO AVAILABLE IN BROWN AND SHARPE AND JARNO TAPERS

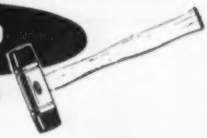
Electric Etchers



Save Time and Expense on Countless Marking and Identification Jobs.

Etcher *burns* a permanent mark into anything made of iron or steel or their alloys. Cheaper than special plates, better than tags. Completely safe, easy. Three models. "Universal" Model illustrated.

Cush'n-BLO



Soft Face Hammers
The *Safer* Hammer that Saves the Surface

Replaceable, interchangeable tips are of super-tough Nuplaflex plastic specially formulated for hammers. Reduces replacement costs by as much as 10 to 1, as compared to many other soft face materials, rawhide, rubber, babbitt, lead, copper or wood. Available in 5 hardness grades and 14 weights.

Electric Marker

Easy to Use as a Pencil

Mark any material from steel to hard rubber or glass. 7200 cutting strokes a minute give fast action. Very inexpensive!

Demagnetizers

Demagnetized Tools Last Longer!

A single pass with the IDEAL Demagnetizer demagnetizes tools and parts held in magnetic chucks, etc. Three models, for large and small parts.

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☐ ELECTRIC ETCHERS ☐ DEMAGNETIZERS

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COMPANY.....

ADDRESS.....

CITY.....ZONE.....STATE.....

Setup and dismounting can be accomplished in a matter of minutes, and when connected, the duplicator does not interfere with conventional use of the machine. By pushing the "stop" button, the Duplimatic automatically disengages and supplementary operations can be performed or another job run in without tearing down the setup. The unit engages again with the "start" button. The Duplimatic is available in three models for controlling one, two or three feeds and may be readily transferred from one machine tool to another.

Denison Engineering Issues New Welcome Booklet

The completion of a handsome and unusually appointed welcome booklet for visitors has been announced by The Denison Engineering Co., Columbus, Ohio. The booklet is designed to be used as a pocket secretary in addition to furnishing information about Denison's plant and offices. Finished in a simulated pigskin leather book-type binding, the booklet has an attached pad of note paper on the front inside flap. On the facing flap is an eight fold insert with illustrative copy informing visitors about the background of the company. There is also a list of company officers, a large map of the Columbus area with landmarks pointed out, and a list of the leading hotels and restaurants. The booklet will be distributed to visitors at the Denison plant and to others on request.

AMAZING NEW UTILITY

1954 FOSTORIA LOCALITES for Machine Tools, Assembly Inspection

MODEL 2-MP-700
Overall length 31"

$7.32 Each
in std. pkg. of 8
Less $9.15 ea.

Reflector—Semi-spherical shape with 6¾" orifice. Rotates 360°. Accommodates 100 watt A-21 or 60 or 40 watt A-19 lamp. Available with lens if desired.

Arm Joints — New patented tension disc. Easy, smooth action with only one hand. Available with 1, 2 or 3 arms.

Base—Universal for vertical or horizontal mounting. Also adaptable to outlet boxes. Collet revolves 360°.

Wiring — McGill industrial socket 4101-FL with Levolier switch. 8 ft. POT-32 18-2 heavily insulated oil resistant wiring with molded plug.

Finish—Gray baked enamel. Reflector interior, high temperature White.

Directs Light Exactly as Needed

WRITE for complete catalog of Localite models for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION
Fostoria, Ohio
Localites available through wholesalers everywhere

LOCALITE fostoria for Light ON the Job
Reg. U. S. Pat. Off.

Hit a new high in GEAR DEBURRING EFFICIENCY on a TWO-STATION UNIVERSAL *Burr-Master*

BME-24 two-station universal Burr-Master deburrs and chamfers both spur and helical gears as well as straight and involute form external splines.

Maximum operator utilization is yours with the BME-24 two-station universal Burr-Master for high production gear deburring and chamfering of spur and helical gears as well as straight and involute form splines.

Both stations can be tooled identically to handle the same gear, they can perform two different operations on the same part, or operate completely independently, turning out large volumes of two entirely different gears. Only one operator is required with any of these setups. At each station you can chamfer the entire tooth form and root at the rate of 5 teeth per second.

High volume isn't all you get with the Burr-Master. Quick and simple changeover and long-life form tools lick the problem of down time and the need for skilled operators.

Complete details in Bulletin 103-60. Ask for it.

14230 BIRWOOD AVE. **MODERN** DETROIT 38, MICHIGAN

Industrial Engineering Co.

Specify DURANT

PRESS ROOM EQUIPMENT

Write Now

for new catalog showing prices and complete line of Equipment.

DURANT Tool Supply Co.

136 SOUTH WATER STREET, PROVIDENCE 3, R. I.

F. W. Derbyshire Corporation Elects New President

F. W. Derbyshire Corp., Waltham, Mass., has announced the recent election of Mrs. F. W. Derbyshire as president of the corporation. She will also continue as treasurer of the firm. Her son, Richard F. Derbyshire, has left the employ of the company and has established his own business. All key personnel, including Shaw B. Smith, vice president, and John J. O'Callaghan, factory superintendent, have remained with the company. The firm will continue to manufacture its line of jewelers and precision lathes, lathe attachments, micromills and attachments and collets.

Hyman Goldburg

Hyman Goldburg, director of sales and service of Parker-Kalon Division, General American Transportation Corp., New York, N. Y., died recently at the age of 52 years. Mr. Goldburg was a member of the Screw Research Association and the American Machinery Manufacturers Association. He was a former president and trustee of the Congregation Sons of Israel in Suffern, New York, where he made his home. Mr. Goldburg was also a thirty-second degree Mason and a member of the Shriners Mecca Temple.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

Before You Buy any Air-Gage

you should know these 4 facts about a T-P CompAIRator

1. It's Faster! There's no flutter nor falling off of the pointer. No guesswork required. Readings are virtually instantaneous *even when long extension hoses are used.*

2. More Versatile! No other air gage matches the instant accuracy of this velocity-type circuit for such a wide variety of applications — from simple internal diameters to simultaneous checks of concentricities, squareness, center distance, etc. — bellmouth or barrel shapes.

3. It Costs Less to Operate! Vibration, hard knocks, jarring — even tilting — do not disturb the accuracy of a T-P CompAIRator. Its rugged construction eliminates expensive maintenance.

4. It Has A Wider Range! A T-P CompAIRator can be simply, quickly applied to check any dimensional relationship — even down to internal diameters as small as .055" . . . tolerances from .0001" to .120". No other air gage approaches this range. It means wider application, greater usefulness, more gaging for your money.

Before you buy any air gage you'll want to talk over these advantages with a Taft-Peirce sales engineer. Discover the dollars and sense savings a T-P CompAIRator can make for you. Write today. (And ask for descriptive Handbook.)

STANDARD AND SPECIAL COMPAIRATORS | AIR ELECTRIC COMPAIRATORS | AUTOMATIC SORTING MACHINE | COMPUTING COMPAIRATORS

T-P means Top Precision

T P

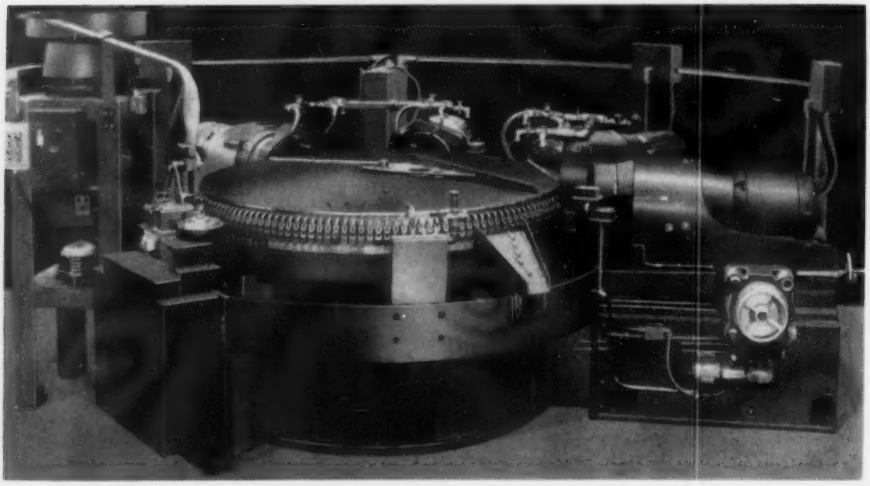
THE TAFT-PEIRCE MANUFACTURING COMPANY, WOONSOCKET, RHODE ISLAND

new shop equipment

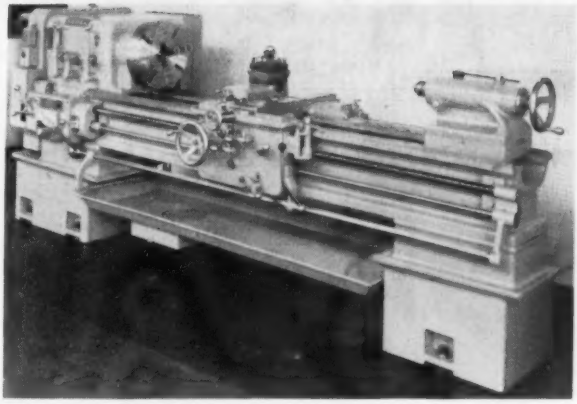
Machine Grinds Spherical Radius on Heads of Automotive Valve Tappets

The Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, Ohio, has announced an automatic grinder which is designed to grind a spherical radius on the heads of automotive valve tappets. The manufacturer states that the radius is produced exactly according to the radius of the table, with 0.015 in. of metal removal provided by four grinding spindles mounted at right angles to the fixture. The tappets are placed into the hopper and are introduced into a double track loading mechanism cammed to load two tappets into the fixture at a time. The table containing the 160 individual fixtures rotates continually at approximately 140 in. per minute in a clockwise direction. The tappets are clamped firmly in the V-type holding fixtures,

Motch & Merryweather Automatic Grinder



Nebel "LA" 16-Inch Engine Lathe



and the continuous clockwise rotation of the table passes the tappets across the face of the rotating grinding wheels, with each of the four horizontal heads removing a portion of the stock. The fourth head is equipped with a special grinding wheel to provide a good finish.

Each grinding head has automatic head infeed to compensate for wheel wear, and each grinding head slide is provided with a hand adjusting screw to permit retracting the heads for grinding wheel replacement. After having been finish ground, the tappets are automatically ejected into a take-off chute, and the open fixtures are flushed by coolant before reaching the automatic loading station. Production, it is claimed, is approximately 4,000 pieces per hour at 100 per cent efficiency. The surface finish obtained is said to average about 10 micro inches.

Engine Lathe Is Heavy and Powerful

Designated as the "LA," a 16-in. engine lathe which is said to be heavy and powerful, provide maximum capacity and approach toolroom lathe accuracy has been announced by The Nebel Machine Tool Co., Cincinnati 25, Ohio. The headstock utilizes shaved and hardened gears throughout, large Timken anti-friction bearings, short shafts and wide gears. Helical drive gears are said to assure smooth, powerful drive.

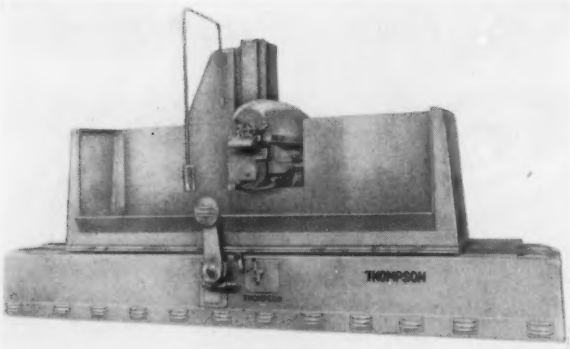
The machine has an 18½-in. swing over the ways and a 24-in. center distance with a 6-ft. bed. It is designed to accommodate either a 7½ or 10-h.p. main drive motor and has 12 or 24 spindle speeds ranging from 13 to 750 r.p.m. The apron and carriage are larger than on previous 16-in. models. The tailstock is larger, too, and has a larger spindle. Gears in the apron and quick-change box are made of heat treated steel.

The Nebel "LA" series lathe is also made in a 20-in. engine lathe size and in 16-in./27-in. and 20-in./30-in. removable block gap models.

Grinder Provides for Fast Removal of Stock While Maintaining Close Limits

Identified as the Type CX, a hydraulic surface grinder which is designed to provide rapid removal of stock while maintaining close limits and fine finish has been announced by The Thompson Grinder Co., Springfield, Ohio. Said to offer the extra power and precision for heavy-duty production grinding, the machine utilizes a heavy base and single column design.

Among the outstanding features of the grinder are cross feeding wheelhead with horizontal spindle grinding



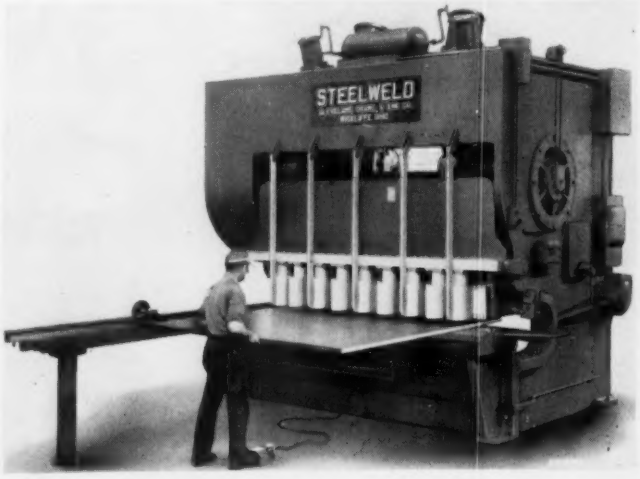
Thompson Type CX Hydraulic Surface Grinder

with the periphery of a 20-in. diameter wheel; rapid and accurate positioning of wheel to work; simplified, centralized control; flame hardened cross slide ways; rigid work table; "in position" wheel truing; direct-coupled motor drive to wheel spindle; low pressure hydraulic system; automatically lubricated ways, slides and spindle bearings; separate cooling system; anti-friction elevating nut; non-adjustable steel back silver lined front spindle bearings; manual cross feed. The machine is available in a full range of sizes from 30 x 26 x 72 in. to 36 x 36 x 24 in., or larger. The table speeds of the grinder are 10 to 100 ft. per minute.

Auxiliary equipment for the Type CX machine includes automatic down feed; micrometer back up stop; dust exhauster attachment; coolant through the wheel; auxiliary hand table feed; coolant filter; magnetic coolant separators; wheel balancing ways and arbors; electric double angle wheel truing; manual fine cross feed; rectifiers and neutrolators for chuck; and demagnetizing switches and motor generator sets.

Machine Shears Heavy Steel Plate Up to 1½ Inches Thick

Designated as the Steelweld Model No. 24G-8, a shear which is designed for production shearing of steel plate in sizes up to 8 ft. long x 1½ in. thick has been announced by The Cleveland Crane & Engineering Co., 6451 E. 281st St., Wickliffe, Ohio. The machine is ruggedly constructed with end housings, crown and bed welded

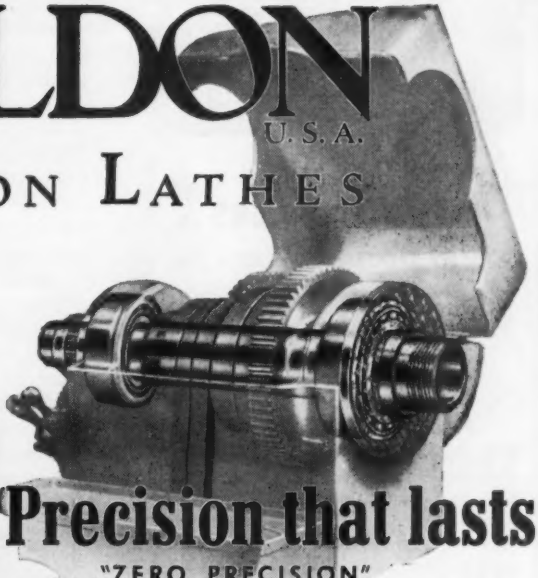


Steelweld Model No. 24G-8 Shearing Machine

SHELDON

CHICAGO U.S.A.

PRECISION LATHES



Precision that lasts

. . . "ZERO PRECISION"
TAPER ROLLER BEARINGS

No lathe can be more accurate than its spindle bearings. Hence before buying any lathe one should check the *exact* type and tolerances of bearings used!

All SHELDON Precision Lathes have "Zero Precision" Taper Roller Bearings, held to tolerances of .00015" —more accurate than the bearings found in most lathes. They are also the sturdy type that hold their accuracy thru long hard use . . . hold it even under abuse. With the other stamina features built into SHELDON Precision Lathes, they assure continued accuracy, without costly maintenance, thru years of hard service.

SHELDON "Stamina" Features:

- Rigid, Heavily cross-strutted 1-piece Beds—2 V-ways, 2 Flat ways
- Full Double-Walled Aprons—all gear shafts supported on both ends.
- Heavy Carriage with wide bearing on bed.
- Twin V-Belts to Spindle for extra power.

Write for Catalog

SHELDON MACHINE CO., INC.
4250 N. Knox Ave., Chicago 41, Illinois

SUPEREAM

18-4-1 STEEL
STUB REAMERS
in Decimal sizes

▼ For real savings, SUPEREAM STUB REAMERS are suited exactly to your specifications in both standard and decimal sizes . . . .060 to .501 in stock. Other sizes ground in 3 - 4 days.

▼ Chucking reamers . . . sizes .032 to .501 in stock also 64ths from 1/16 to 1/2 and standards in stock. REAMERS or COUNTERBORES in separate sets, or individually. High-speed fluted chucking reamers with straight shanks also ROSE high-speed.

Send for Bulletin No. 15

CHUCKING
REAMERS IN
DECIMAL SIZES

▼ Tailor made for your production economy. Each tool is available in Standard size . . . Plus an undersize and oversize dimension to meet the demand PRECISELY. All flutes are ground on face and back *after* heat treatment for remarkably smooth reaming, preventing clogging or freezing of chips.

Send for descriptive Bulletin No. 10

In Emergency phone LIBERTYVILLE 2-4200.

TWENTIETH CENTURY
MANUFACTURING CO.
ROUTE 176 and BRADLEY ROAD
BOX 429M, LIBERTYVILLE, ILL.

into a solid one-piece unit. The end housings are provided with heavy, deep throat forgings that greatly add to the frame strength and also increase shearing possibilities, especially for certain angle cuts and slitting. The machine operates on the pivoted-blade principle, whereby the blade travels in a circular path without the use of guides and slides. An electric foot switch, which can be moved about the floor to the most convenient position, is used for operating the shearing machine.

The clutch and brake unit is air operated and designed with a low-inertia principle that permits long continuous runs of shearing without overheating. The unit is fast acting and is said to provide quick, positive clutching and braking with very little slippage. The shearing machine is equipped with a micro-set knife adjustment which makes it simple, quick and easy to adjust knife clearance to suit the thickness of the metal being cut.

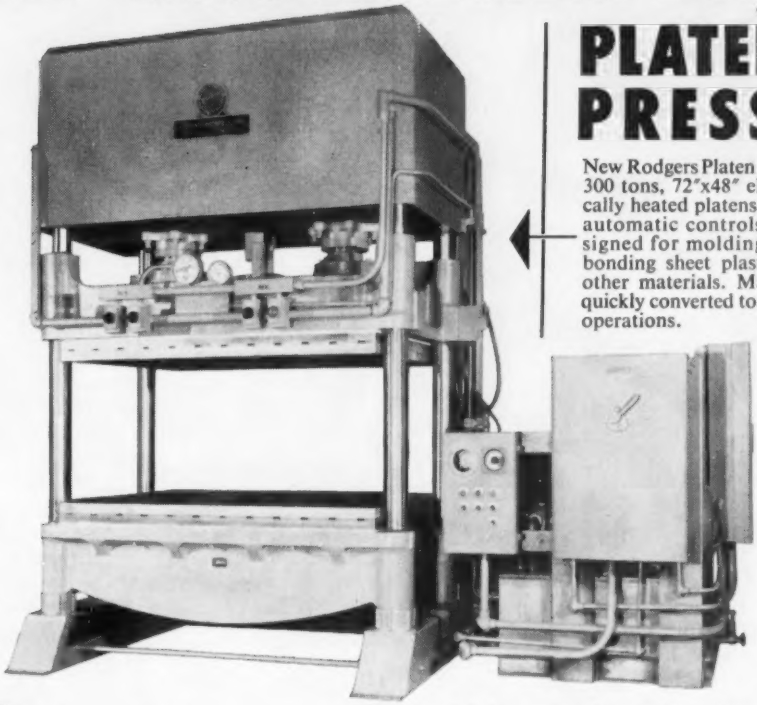
The adjustment can be made in a few seconds by turning a convenient hand crank and observing a large dial indicator. When the hand is on the figure representing the plate thickness, the machine is ready to cut. The operating speed of the machine is 22 strokes per minute. Adjustments are provided to enable slitting and notching. Main and eccentric bearings are lubricated by an automatic oiler system.

Toolroom-Size Furnace Features Gas-Fired Radiant Tubes

Lindberg Engineering Co., 2469 W. Hubbard St., Chicago 12, Ill., has announced a toolroom-size atmosphere box furnace which utilizes gas-fired radiant tubes and which is said to be ideal for heat treating virtually all production and tool steels, except high speed, where it is essential to

New RODGERS *"Double Duty"*

PLATEN PRESS



New Rodgers Platen Press, 300 tons, 72″x48″ electrically heated platens, with automatic controls, designed for molding and bonding sheet plastic to other materials. May be quickly converted to other operations.

1 forms or draws metals

2 molds and bonds plastics in ONE operating cycle

Are you processing both metals and plastics? This newest Rodgers Platen Press is quickly converted for metal or plastic operations—a "double feature" advantage that means equipment savings.

Heated platens, which mold sheet plastic *and* simultaneously bond it to metal, rubber or other materials, are interchangeable with metal forming or drawing dies. By using pneumatic die cushions, the press can be converted for deep drawing of metals.

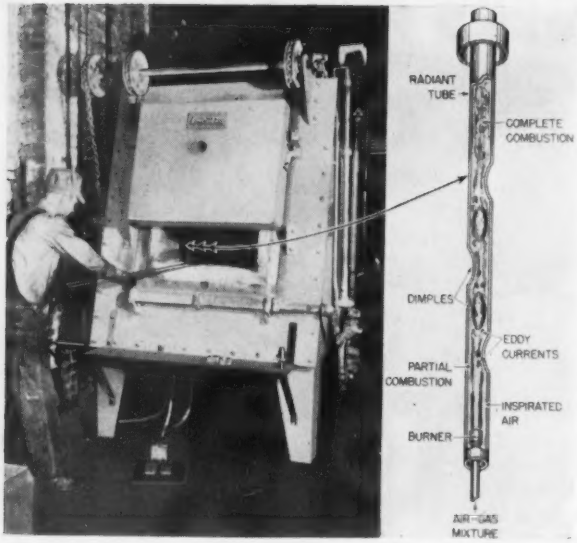
Rodgers "Double Duty" Presses are available in 10 to 500-ton capacities and with platen sizes from 12″x12″ to 72″x48″. Precision control equipment automatically governs platen movement, pressure, time cycles and temperature. Operator safety is assured by equipment design.

MANUFACTURERS. If you're processing metals and plastics you'll be interested in this double duty press; let us send you more information and also a copy of our catalog describing other Rodgers "Blue Ribbon" Presses for plastic and rubber molding, metal drawing and metal forming.

HYDRAULICS Rodgers KEEP THE WORLD MOVING

Rodgers Hydraulic Inc.

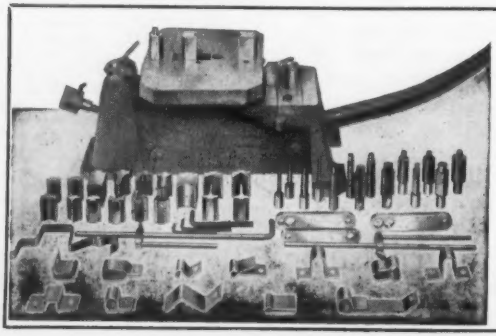
7447 Walker St. • Minneapolis 16, Minn.



Lindberg Toolroom-Size Atmosphere Furnace with Gas-Fired Radiant Tubes

keep the work scale and decarburization free. The center stream of the radiant tube is a mixture of gas and a relatively small amount of air, insufficient for complete combustion. Indentations approximately 1-in. deep on 6-in. centers are located around the circumference of the tube, top to bottom. As the stratified stream of gas and air mixture and the straight air surrounding it pass up the tube, the first "dimple" sets up an eddy current which mixes the air with some of the air-gas mixture, accelerating the combustion rate. As the streams move further upward, additional dimples continue the mixing until completed.

The tubes are suspended along the sides of the furnace chamber and are made of thin walled tubing. The light, straight tubes are said to provide maximum heat transfer rate through the tube wall and minimum internal tube temperature for long life. All tubes are fired at the lower end and are readily removable through the furnace arch without the need for cooling the furnace or interrupting the operations. The shell is made of heavy steel plate reinforced with structural members and is continuously welded to be gas tight. An automatic gas-air curtain is provided which fully covers the vestibule when the door is opened. Furnace doors are of the vertical lift type. The maximum operating temperature of the furnace is 1,850 deg. Fahrenheit.



Multiform
BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies ,Etc.

AIR OR HAND MODELS FOR UP TO 1/4" to 4" MATERIAL

Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.

Dept. 6-M Kalamazoo, Mich.

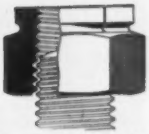
This portable electric hammer is completely self-contained. So are the FLEXLOCs that hold it together, even under the intense impact vibration induced by the rapid hammering action.

FLEXLOCs chosen to withstand vibration of 3000 hammer blows per minute

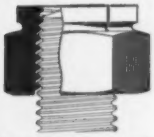
The manufacturer of this hammer reports, "FLEXLOC Self-Locking Nuts have solved our problem of obtaining a desirable fastener, because they withstand the terrific vibration induced by the impact of 3000 hammer blows per minute without working loose."

The FLEXLOCs were selected only after numerous fastening devices had been tested. Two ¼"-20 nuts hold the fastening bolts securely in position on the forward end of the hammer. One 1"-14 nut prevents loosening of the components at the nose.

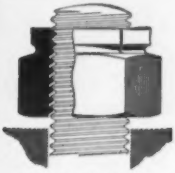
FLEXLOCs of various types and materials in a wide range of sizes are stocked by leading industrial distributors everywhere. See your FLEXLOC distributor or write for literature and samples. STANDARD PRESSED STEEL COMPANY, Jenkintown 22, Pennsylvania.



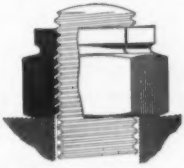
Starting. A FLEXLOC starts like any ordinary nut. Put it on with your fingers. Tighten it with a standard hand or speed wrench.



Beginning to Lock. As the bolt enters the segmented locking section, the section is expanded, and the nut starts to lock.

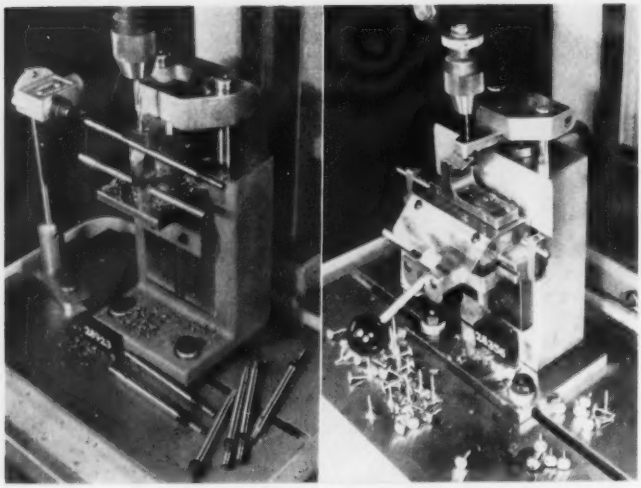


Fully Locked As a Stop Nut. When 1½ threads of a standard bolt are past the top of the nut, the FLEXLOC is fully locked. A FLEXLOC does not have to seat to lock.



Fully Locked As a Seated Nut. When it is used as a lock or stop nut, the locking threads of the FLEXLOC press inward against the bolt, lifting the nut upward and causing the remaining threads to bear against the lower surface of the bolt threads. Vibration will not loosen a FLEXLOC, yet there is no galling of threads.

FLEXLOC LOCKNUT DIVISION **SPS**
JENKINTOWN PENNSYLVANIA



(Left) Snow Universal Clamping Fixture set up for cross-drilling operation on a shaft. (Right) Sliding base adaptation for drilling multi-holes in parts

Clamping Fixtures Are Adaptable to Drilling, Counterboring, Tapping and Reaming

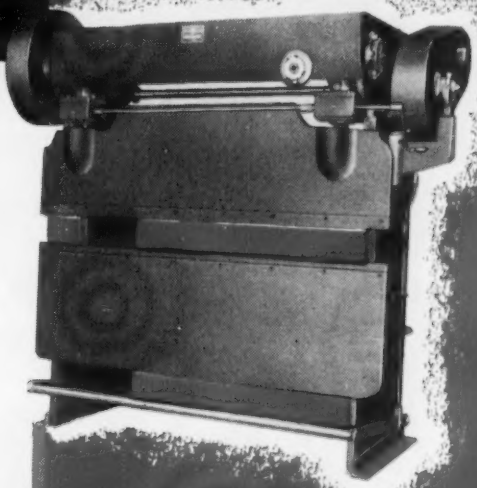
Snow Mfg. Co., 455 Eastern Ave., Bellwood, Ill., has added to its line of standard master fixtures two vertical air operated clamping fixtures, designated as the Nos. 8 and 9. These fixtures can be adapted to a wide range of work involving drilling, counterboring, tapping and reaming. The view at the left in the accompanying illustration shows a universal clamping fixture adapted for a cross-drilling operation on a shaft. The tooling consists of a standard stud and bushing plate arranged so that the part, when inserted, contacts a micro switch (providing accurate and positive location) which initiates the spindle cycle and synchronizes the clamping action of the fixture. As soon as the cycle is completed, the part is ejected by the spring-loaded contactor.

The view at the right in the illustration shows a sliding base adaptation for drilling multi-holes in parts. The work holder varies with the type of part; however, the base is standardized. Proper position is obtained with the stops on the slide-base, while the clamping and drilling cycle is synchronized by lifting the lever into the accurate spacing notch on the crossbar to contact the micro switch. The Snow Nos. 8 and 9 Universal Clamping Fixtures are air-operated and develop 148 and 276 lb. clamping pres-

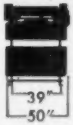
ON OILY AND GREASY FLOORS
STOP
COSTLY SLIPPING ACCIDENTS
USE Tamms
FULLER'S EARTH
Adds greatly to the safety of your shop • Provides safe non-slip footing • Absorbs oil and grease • Lessens fire hazard because, unlike saw dust or wood shavings, it is non-inflammable • Every shop needs this low cost safety aid.
A trial will convince you. Send for FREE SAMPLE.
DEPT. RM-9
TAMMS INDUSTRIES, INC. 228 N. LA SALLE ST., CHICAGO 1, ILL

Royal PRESS BRAKES

SERIES 35



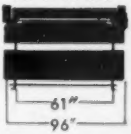
48" x 10 GA.



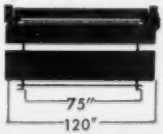
60" x 12 GA.

72" x 14 GA.

96" x 16 GA.



120" x 18 GA.



with these outstanding features:

- FRONT OPERATED VARIABLE SPEED DRIVE
- HAND OR MOTOR DRIVEN RAM ADJUSTMENT
- ONE PIECE WELDED STEEL FRAME
- CLEAR WORKING SPACE IN FRONT AND REAR
- OVERSIZE LONG SLIDE SURFACES, CONNECTING RODS AND BEARINGS

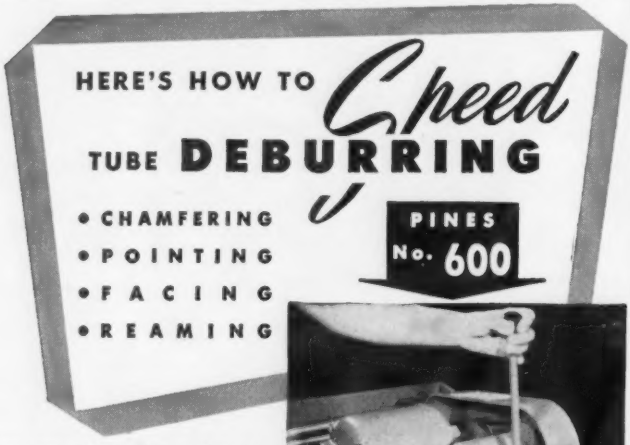
Send for Catalog 54A, listing special features. We invite your inquiries about our dies which fit all standard press brakes. Inquire about our rental plan!

Royal PRESS CO. Inc. 550 W. Monroe St., Chicago 6, Ill.

sure respectively on 100-lb. line pressure. A pressure regulator, built into the machine, provides adjustment of desired clamping power. Blank studs and top plates are available in various sizes.

Corrosion Resistant Protective Coating

Identified as "Rubalt" Grade "RA," a black rubber-base paint which is said to provide maximum resistance to acids and alkalis, mineral oils, rust, dirt and algae growth has been announced by Alfred Hague & Co., 227 34th St., Brooklyn 32, N. Y. The combination of chlorinated natural rubber and bitumen, together with modifiers and appropriate solvents, produces the paint which looks like patent leather and has a rubbery feel. According to the manufacturer, the general characteristics of the paint include unusual non - porosity, great flexibility, maximum adhesion, striking resistance to many acids and alkalis, non - flooring under heat, unusually low temperature resistance and waterproofness. It is claimed that the paint can be used successfully on galvanized iron, aluminum, magnesium and zinc without the use of a primer or surface treatment. The paint is supplied ready mixed and requires no stirring. If thinning is desired for brushing or spraying, an aromatic or coal tar derivative solvent is preferable with a medium rate of evaporation for brushing and a fast rate of evaporation for spraying.



The Pines No. 600 End-Finishing Machine is designed for fast, accurate work. Women operators commonly debur up to 800—1" tube ends per hour. Exclusive operating features include single lever control which clamps and feeds work to rotating cutters in one pass, enabling operator to have one hand free for stock handling. Small and compact, the Pines machine is equipped with quick, interchangeable tool holders, chuck inserts, 8-speed sheave (760 to 3920 rpm), sturdy spindle, and grease-sealed precision bearings. The No. 600 unit illustrated, handles stock diameters up to 2". Maximum feed stroke is 1¼". Automatic air-operated units are also available for higher production work, and larger models for stock sizes up to 5".

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Write for facts on how these machines cut costs on a wide range of work.

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Specialists in Tube Fabricating Machinery 644 WALNUT • AURORA, ILLINOIS
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The best "soft" hammer your money can buy!

Tough, resilient water buffalo faces deliver plenty of power with full protection for delicate parts and finishes. Faces are easily replaced, and comfortable Safety-Flare handle gives you non-slip grip. Work goes better with a C/R RAWHIDE Jaw-Head. See for yourself.

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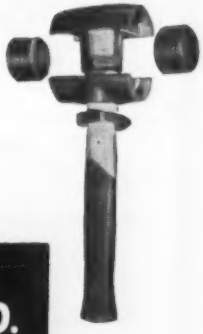

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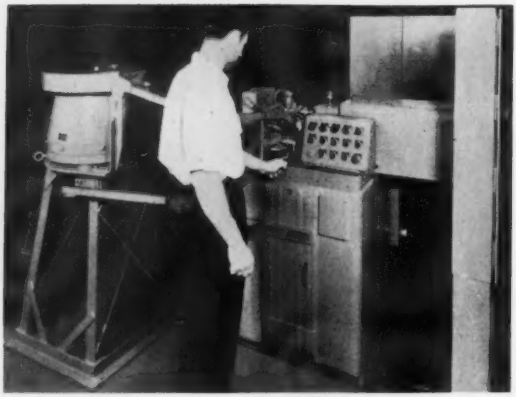
In Canada: Super Oil Seal Mfg. Co., Ltd., Hamilton, Ontario

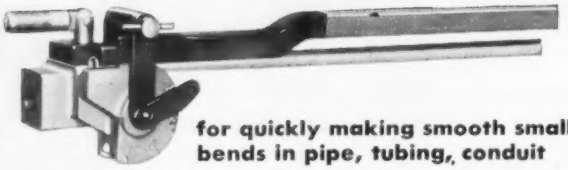


Red Ring Model GSC Automated Gear Speeder Inspection Unit in use

Unit Loads, Sound Tests and Unloads Gears Automatically

Identified as the Red Ring Model GSC, an automated gear speeder inspection unit that automatically loads, speeds spur and helical gears for sound tests and unloads the gears onto a conveyor line has been announced by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. The machine is said to cut production time by completely eliminating all manual loading, unloading and control functions. The operator listens to the sound of the production gears as they are rotated in contact with a master gear and diverts any gears from the unloading chute which do not meet inspection standards for sound. Gears from a conveyor are directed to a vibrating type hopper feed device in the unit from which they are fed through an input chute to a storage magazine ahead of the automatic loading device

GREENLEE HAND BENDER



for quickly making smooth small-radius bends in pipe, tubing, conduit

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit

TOOLS FOR CRAFTSMEN
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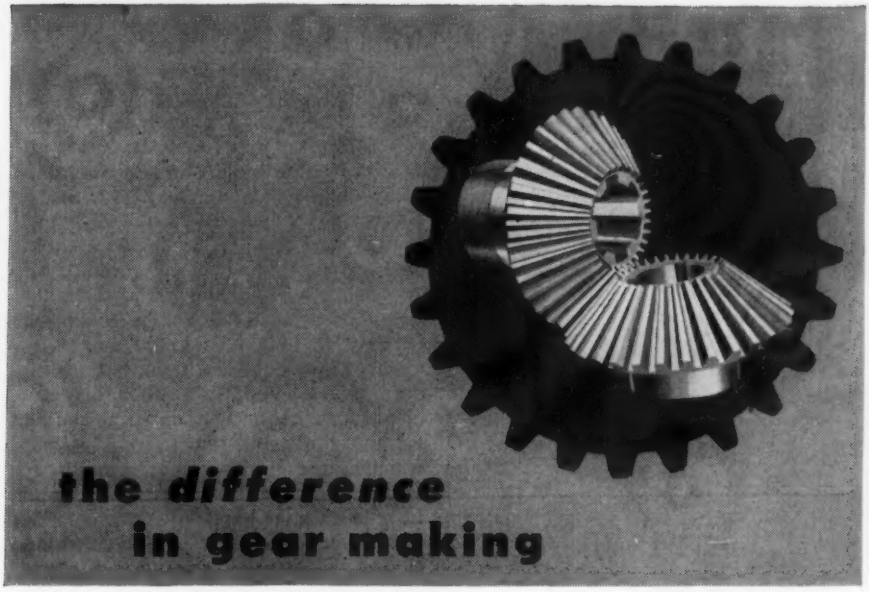
GET FREE FOLDER E-207 AND BOOKLET E-201. Complete facts and prices on the Greenlee Bender line. Write Greenlee Tool Company, 1990 Herbert Avenue, Rockford, Illinois.



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the ADAMS line . . . Spur gears • Bevel and Miter gears • Worms and worm gears • Sprockets • Internal gears (spur and helical) • Ratchets • Splined shafts • Lead and feed screws • Shaved Tooth gears (spur and helical) Ground thread worms • Racks.

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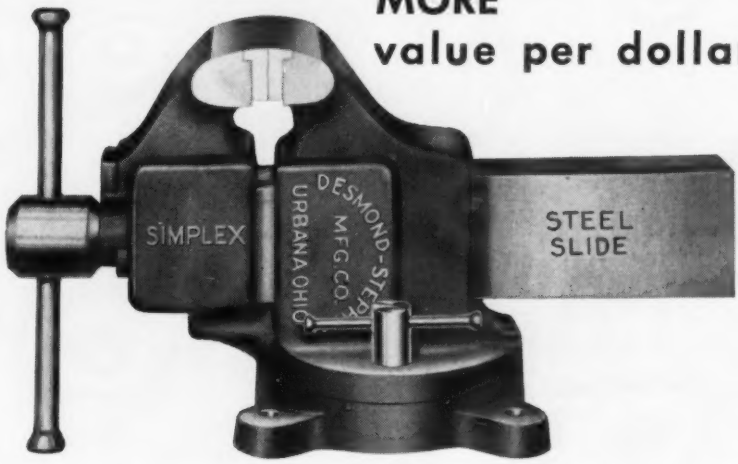
on the speeder. The hopper feed operates intermittently and is controlled by the loading condition of the input chute.

The loader is of a standard rocker-type design which feeds the gears one at a time from the storage magazine into mesh with a master gear. At the same time a gear is loaded in speeding position, a finish tested gear is dropped into the unloading chute and is directed back to a gear conveyor line. The gear is supported during the test by an expanded arbor that automatically enters the gear during the loading sequence. This arbor is mounted on the headstock and expands in the bore of the gear. A diverter in the unloading chute is manually operated to direct unsatisfactory gears to a table area on top of the speeder unit where the gears can be examined further by the operator and nicks or burrs removed by a pencil grinder. Push-button controls are included for each machine function to facilitate setup operations. Air cylinders control the work arbor, loader and brake functions.

Gage Measures and Sorts Roller Bearings for Diameter and Length

Designated as the Model 143 B-9, a completely automatic, hopper fed, electronic gage for measuring the overall length and outside diameter of highly polished cylindrical roller bearings and sort them into 12 classifications of 0.0001 in. each, plus scrap and salvage, has been announced by Federal Products Corp., 4148 Eddy St., Providence 1, R. I. The gage operates at a speed of from 6,000 to 8,000 roller bearings per hour and can be quickly adjusted to handle bearings with diameters and lengths ranging from $\frac{3}{16}$ to $\frac{5}{8}$ inch. From the vibrating type hopper located near the gage, the workpieces, lined end to end, drop down a vertical feed chute

MORE value per dollar



This steel slide—proven unbreakable in years of industrial service—is the extra built into Desmond-Simplex vises—the extra without the extra cost.

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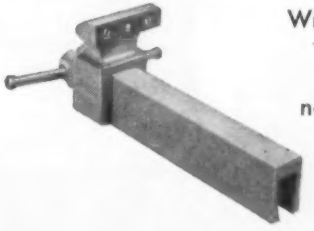

Write for copy of new vise catalog and name of your nearest Desmond-Simplex distributor.

STANDARDIZE ON EXTRA VISE VALUES

Desmond

THE DESMOND-STEPHAN MFG. CO., URBANA, OHIO

to a platen beneath the mount of the feed chute. Here a reciprocating feeding finger pushes each workpiece into a slot in a rotating carrier wheel which carries them to the diameter and length gaging stations.

At the gaging stations, the workpiece is pulled between the contacts and its outside diameter and length are found by two electronic gage heads. These signals are transmitted to amplifiers, then to classifiers which

Federal Model 143 B-9 Electronic Roller Bearing Gage

"set" the mechanical memory located beneath and keyed to the main carrier wheel. The rotating carrier wheel next guides the gaged workpiece to the disposal unit. When the workpiece is above the correct disposal chute, the mechanical memory causes a lever to be released, opening the trap door, and the workpiece drops into a tote box below. All timing, measuring and recycling of the gage is controlled by timing cams and microswitches located at the base of the memory unit.

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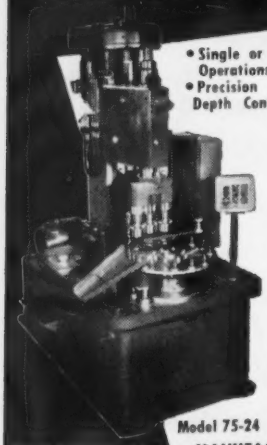

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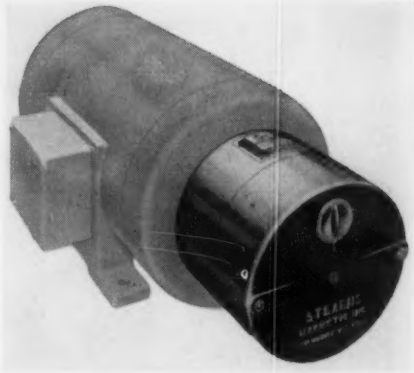
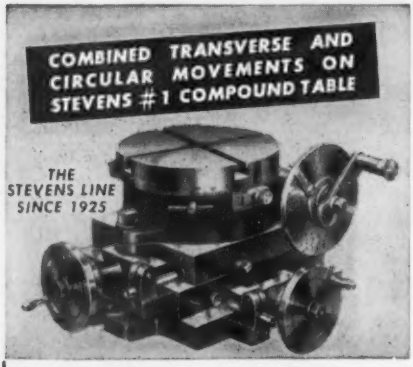
Redesigned Magnetic Disc Brake Is For Use on Rerated Motors

Stearns Magnetic, Inc., Milwaukee 46, Wis., has announced a redesigned magnetic disc brake, identified as the H-70, which is designed for use on rerated 3 through 20 h.p. motors. The brake is available in maximum torque ratings of 10, 15, 25, 35, 50, 70, 75 and 105 lb. ft. and mounts on new frame sizes 213 through 286. The H-70 is up to $\frac{13}{16}$ in. shorter than previous model brakes. A feature of the redesigned brake is a manual release-automatic reset wear indicator. The spring set solenoid released brake can be supplied for either horizontal and vertical motor mounting or independent floor mounting, with standard or dust-tight, waterproof enclosure.



Stearns H-70 Magnetic Disc Brake



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Machine Performs Simultaneous Cam and Crank Finish Boring and Facing Operations

Designated as the Boreface, a machine which performs simultaneous cam and crank finish boring and facing operations has been announced by National Automatic Tool Co., Inc., Richmond, Ind. The machine, which employs two heads, speeds production

You Need an Extra Hand Now to Speed Up Production!

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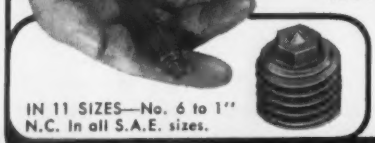

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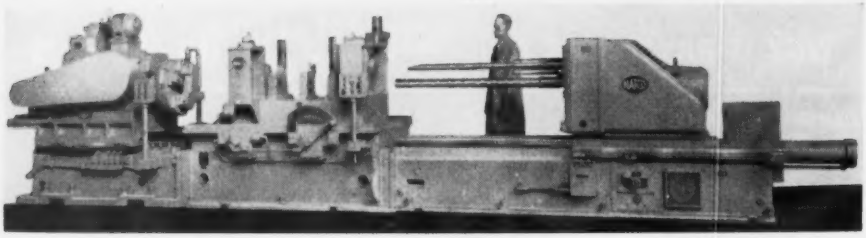

Natco Boreface Machine

of diesel engine blocks by finish boring cam and crank holes and boring and cross-feed facing flywheel case simultaneously.

The locations and diameters of the straight alignment bores are said to be held to unusually close tolerances. The finish facing on the flywheel housing and the cover is held square with the crankshaft bore to within .0025 in. total indicator reading. According to the manufacturer, these tolerances are made possible by the built in accuracy of the machine and because all operations are performed with one locating of the part. The right-hand head finish bores seven (in line) main bearings, oil retainer and cover, four (in line) camshaft bearing inserts and two holes while at the same time the left-hand head rough, semi-finish and finish bores, and cross-feed faces the flywheel housing and cover.

Punches Shaped from the SOLID with OTTMANN Punch Shaper

FEATURES:

1. No holder plates required.
2. Simple work mounting.
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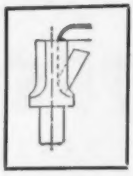
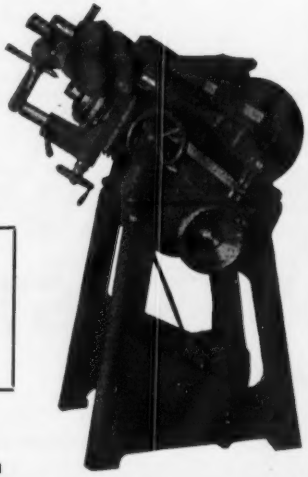
5. Minimum hand work.
6. Convenient, simple operation. Uses standard shaping tools.





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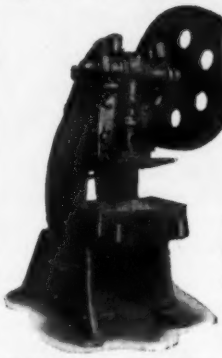

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Write for descriptive literature and price list.

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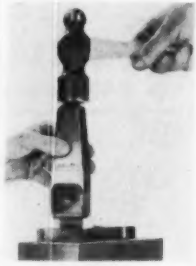
Lightweight Type Holder Stamps Steel, Cast Iron and Other Materials

Designated as the Hercules Junior, a lightweight holder which is designed to hold Hercules Shoulder Style Interchangeable "Gang" Type for stamping on steel, cast iron and other materials has been announced by The Acromark Co., 9 Morrell St., Elizabeth, New Jersey.

The type holder is made of one piece of steel with a rectangular shaped mortise to receive the interchangeable type and is available in sizes ranging from a two to an eight piece capacity. The holder can be used with less than full capacity by substituting blank spaces for the type characters. No mechanical parts interfere with the operation of the holder, but there is a spring tension clip that holds the type in position from the outside of the holder. Immediate changing of the type can be performed by exerting a little pressure on the front clip and removing the type.

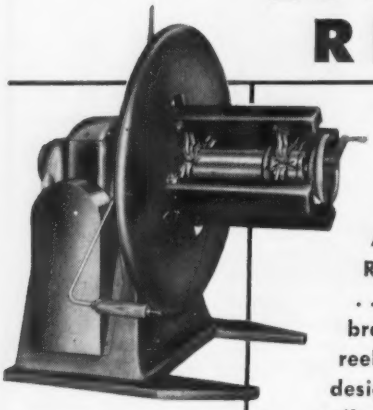


Acromark Hercules Junior Type Holder in use

According to the manufacturer, the style of the holder is attractive, and it fits the hand, balancing itself for easy use with a hammer blow. Sizes of type available for use in the holder range from standard 1/16 in. up to and including 1/8 in., Gothic characters.

100 TO 40,000 POUND COIL CAPACITY

LITTELL REELS



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Whether you feed stock from 100 pound coils or 40,000 pound coils, there is a Littell Automatic Centering Reel to meet your needs . . . motor driven, electric brake and plain brake reels. Every Littell Reel is designed for swift, safe coil replacement and smooth, *controlled* uncoiling. All models combine smooth running accuracy with rugged construction that assures *extra* years of dependable service.

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Write for Littell Reel Catalog Data

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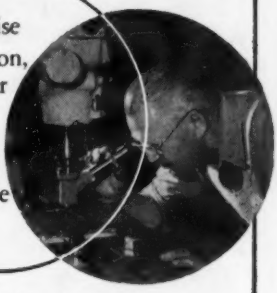

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- Image always appears erect and true
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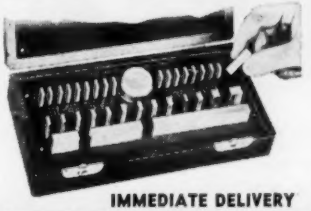

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Opt. Parallel $5.00 Extra
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Write for Illustrated Folder—Code GINVU

"Lustro-Chrome" MICROMETER

Take the GLARE out of Micrometer Reading with the New "Lustro-Chrome" MICROMETER

MEASURE TO 1/10,000th

Ask for Micrometer Catalog—Code GINWY

All graduations are well-defined black lines on dull chrome surface for easier and surer reading, even in poor light. Guaranteed accurate within one half of a ten thousandth of an inch.

No. 901C
0-1" Size with LOCK NUT and RATCHET and 10th Vernier as shown $13.25
Code GHAEF

This tool with TUNGSTEN CARBIDE tipped anvils $15.75
Code GHAEF-CA

Drop-forged model with chrome finished micrometer head from $8.25 up.

GEORGE SCHERR CO., Inc.
200-MM LAFAYETTE ST. • NEW YORK 12, N.Y.

PAY LESS FOR YOUR SCREW MACHINED PARTS

Unique Problems...

PORTERS SPECIALTY!

Porter offers a *complete* service—modern equipment, universal tooling—manned by competent personnel with 25 years experience.

We specialize in Screw Machine and Centerless grinding service not readily available from many sources.

PRECISION *PRODUCTION*
PRECISION *DELIVERY*

Perhaps you've had difficulty in getting a specific job done properly—promptly—at low cost. Bring your problems to Porter.

Send Porter your specifications on Screw Machined Parts you buy outside your plant—and Porter will submit a precise quotation. Tell us exactly what you want—and we'll prove that you get it done better—at *less* cost when you depend on Porter. Our know-how gained in *25 years'* experience will save money for *you*.

Check with Porter today—and start paying less for your parts.

PORTER OFFERS YOU:

1. **Material of *your* specifications.**
2. **Bar & Rod Grinding Facilities.**
3. **Screw Machines (Brown & Sharp).**
4. **Swiss Automatic Screw Machines.**
5. **Complete Secondary Operation.**
6. **Heat Treat and Plating.**
7. **Centerless Grinding Facilities.**
8. **Precision Inspection.**
9. **Proper Packaging.**
10. **Shipment — *when* and *how* you want it.**

FROM START TO FINISH—YOU'RE BETTER OFF WITH PORTER **Prove it — today!**

PORTER MACHINE CO., INC.
3100 ENYART AVENUE
CINCINNATI 9, OHIO

Sectional Bins Hold Very Small Parts, Tools and Materials

A small sectional Stackbin, identified as the O-Section, which has eight individual bins and which is designed to hold very small parts, has been announced by Stackbin Corp., 1083 Main St., Pawtucket, R. I. Used in conjunction with other sectional Stackbins, O-Section is said to greatly increase possible storage variations by

The last three tiers of this Stackbin system include the newly-announced O-Section Stackbins.

providing "tailor-made" space for the smallest tools, parts and materials. With six interstacking sizes of sectional Stackbins with from two to eight openings in each, the user can vary the number and size of openings in the storage system to fit his own needs.

Because all the sectional bins are built from the basic Stackbin design, they can be set up or rearranged quickly, without the use of tools, merely by stacking one sectional bin upon another.

AUTOM

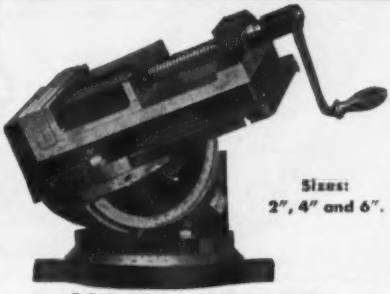
CONTINUOUS HINGES

Manufactured by

AUTO MOULDING & MFG. CO.

WRITE FOR STOCK LIST

1114 E. 87TH ST. CHICAGO 19



Sizes: 2", 4" and 6".

MAKE SET-UPS *FASTER--*

Conserve valuable production time by using the fully universal, easily-operated MASTER MULTI-SWIVEL VISE for intricate, angular set-ups in your shop. Three swivels instantly set any compound angle. Used in shops throughout the world. Interchangeable platen optional.

Write for Circular

DONOVAN MFG. CO.

80 BATTERYMARCH ST., BOSTON 10, MASS.

Always **MAKES SET-UP JOBS EASIER**

Ask anyone who has ever used a Ziegler Tool Holder in making set-ups for tapping and reaming and he will tell you that it takes much less time and effort than with a tool holder that does not have the special Ziegler features.

With ordinary tool holders it is a time-consuming job to align the work accurately with the spindle. But with the Ziegler all that is necessary is to align it to within 1/32" of perfect accuracy and the holder automatically does the rest.

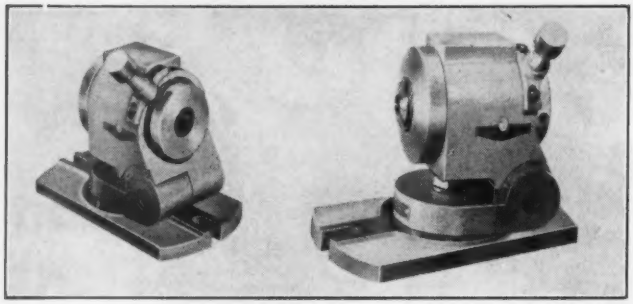
Besides reducing set-up time, it also produces better work and makes tools last longer. Investigate! It may be the solution to your production problem.

Ziegler ROLLER DRIVE **FLOATING HOLDER** for Taps and Reamers...

W. M. ZIEGLER TOOL CO.

13566 AUBURN DETROIT 23, MICH.

WRITE FOR CATALOG



Kuma Model C-404 Precision Universal Dividing Collet Heads

Precision Universal Dividing Collet Head

Identified as the Model C-404, a precision universal dividing collet head for use in the production milling, drilling, counterboring, reaming, tapping and grinding of equal or irregular circular spacings using an exact division index plate to minimize errors and a quick-action collet closer has been announced by Kuma Tool Co., 8751 S. State St., Chicago 19, Ill. Said to be adaptable for collet grinding on external grinders, the tool can also be used for sharpening side and plain milling cutters, as well as many other cutting tools. According to the manufacturer, the tool can also be adapted for use as an angle dresser by employing a CA 775 angle wheel dressing attachment; as a radius dresser with the use of a CA 785 radius dressing attachment, and can mount a three or four-jaw chuck by the use of a CA 795 chuck adapter.

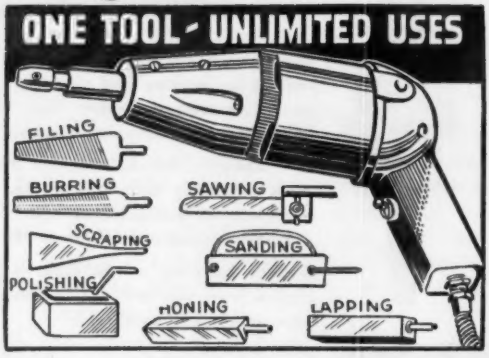
B-R-E-A-K . . . .
Hand Finishing Bottlenecks

with

PORTABLE • ELECTRIC RECIPROCATING TOOLS

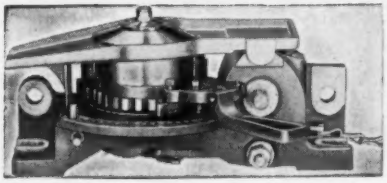
These handy tools will cut out many tedious hand filing and finishing operations — Increase Production — Produce Uniform Work.

Light in weight—Delivers 1/8" or 3/8" fixed stroke at 1000 strokes per minute—Operates on 110 volts AC or DC.



ACME TOOL COMPANY
73 WEST BROADWAY **NEW YORK 7, N. Y.**

MODEL H AUTOMATIC
Chucking & Indexing Fixture



1. 1800 light cuts per hour.
2. Either horizontal or vertical position.
3. Collets changed instantly.
4. Automatically knocks piece out.
5. Ratchet or degree indexing — degree indexing added later if desired. Capacity 1".
6. Automatic indexer also added later.

Model F—Both degree and ratchet indexing. Capacity up to 2¼".

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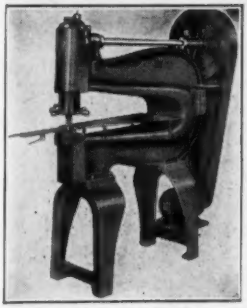
J. W. DEARBORN • Ansonia, Conn.

SAVAGE
NIBBLING MACHINES



CAPACITIES UP TO ¾"

—

ASK FOR FREE BULLETIN "J".

—

"NIBBLE YOUR COSTS"

FOR TUBE SLOTTING, TUBE SHAPING AND FAST AND ACCURATE CUTTING OF FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE

W. J. SAVAGE COMPANY

Knoxville *Since 1885* Tennessee

PIONEER MFRS. OF NIBBLING MACHINES

ACROMARK
MEANS "ACCURATE MARKING"

ENAMEL FILL
WITH COLOR, or PRINT- STAMPED, DIE-CAST, EMBOSSED
AND MOLDED METAL AND PLASTIC PARTS WITH —

The ACROPRINTER
Reg. U.S. Pat. Off.

MADE BY THE MAKERS OF:—

MARKING & NUMBERING MACHINES, NAME-PLATE STAMPING MACHINES, NAME-PLATES, STAMPS, DIES, TYPE, METAL SIGNS, METAL INKS, BURNING BRANDS, AND ALL KINDS OF STANDARD OR SPECIAL MARKING EQUIPMENT AND PRODUCTS.

Write For Latest Catalog.

The ACROMARK *Company*

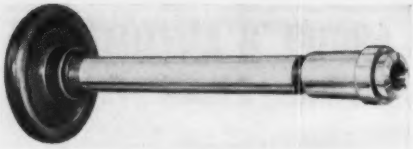
9 MORRELL ST., ELIZABETH 4, N. J.

"THE ORIGINAL MARKING SPECIALISTS"

The tool is equipped with special precision roller bearings and oil seals for dust protection. It is precision ground all over to a 0.0005-in. tolerance and utilizes a hardened and ground collet spindle. Indexing plates are available with 2 to 36 spacings.

Draw-In Bar and Collet Sleeve Attachments for L-W Dividing Heads

Draw-in bar and collet sleeve attachments for use with L-W Dividing Heads have been developed by L-W Chuck Co., 28 S. St. Clair St., Toledo 4, Ohio.



L-W Draw-In Bar and Collet Sleeve Attachment

The attachment for the 11-in. Models BP and AU heads will accommodate up to a ¾-in. round standard-type 2L collet. Another draw-in bar and collet sleeve attachment for use with the 6½-in. Model SD dividing head is designed to take up to a ⅝-in round standard-type 4 NS collet.

World's Hardest Metal
TOOLS
BLADES
ROLLS
BAR STOCK
DIES
Many times more durable than steel, Talide Metal adds years of life to the wearing edges of tools, dies, machinery and equipment.
Hard as a diamond and almost indestructible, it triples output per man and per machine.
For good service and recommendations for improving any cutting, drawing or wear-resistant application, send particulars to Metal Carbides Corp., Youngstown 7, Ohio. Write for Catalog No. 54-G
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SINTERED CARBIDES · HOT PRESSED CARBIDES
HEAVY METAL · CERMETS · HIGH TEMPERATURE ALLOYS
OVER 35 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

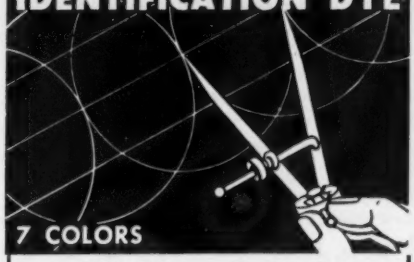
Index Table Has Built-In Safety Features

Michigan Drill Head Co., Detroit 34, Mich., has developed an index table which incorporates built-in safety features. The table is completely hydraulic operated with a positive location from a tapered shot bolt. The shot bolt is operated from a hydraulic cylinder

"Get them from Gillen"

John Gillen Company
INC.
2542 SOUTH 50th AVENUE • CICERO 50, ILLINOIS

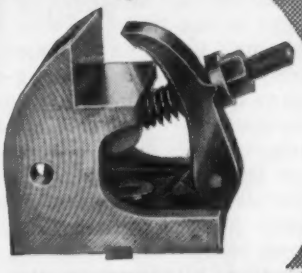
Miccro Supreme
LAY-OUT AND IDENTIFICATION DYE



For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY
8615 Grinnell Ave. • Detroit 13, Mich.

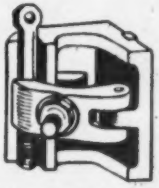
REDUCE
set-up time and the need for expensive jigs and fixtures



HART MILLING FIXTURES
"Masters of A Thousand Set-ups"

Many special set-ups can be handled with these inexpensive, versatile fixtures. Hold round, hexagonal, octagonal or square stock, aligning work with machine. Value proved for years in large and small shops.

STAND ON END FOR STRADDLE OR END MILLING



4 sizes hold stock from ½" to 4½". Any size holds smaller stock with shims.

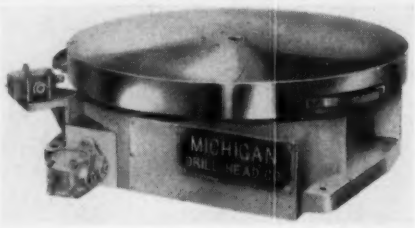
WRITE FOR NEW ILLUSTRATED FOLDER

WALTER W. FIELD & SON, INC.
39 Hayward St., Cambridge 42, Mass.

with a pressure relief valve to control the amount of pressure applied to the bolt. The table is driven by a fluid-drive motor. Should the drill head or other units engage the fixture while the table is operating, the table, it is claimed, will stop automatically. The oil in the fluid-drive motor will not drive the table when it meets any resistance, making it impossible for an operator to get caught in the table.

The unit is simple in design, having merely a worm and a worm gear, with a large gear driven from a point near the outside diameter of the table. The driving load is said to be controlled from the fastest point on the table. A decelerating valve shuts off the oil supply just before the shot bolt is placed in the cup, providing smooth operation. Furthermore, the gradual closing of the oil supply prevents any shock to the shot bolt.

The hydraulic oil, which is used for operating the table can be taken from any hydraulic source on the machine.



Michigan Index Table

This is possible because the feeding units are stationary when indexing; therefore, oil can be obtained from a source that normally would be dumping oil over a relief valve. The index table is available in four sizes—20, 30, 42 and 60 in.—and can be bored for any number of stations, ranging from two to 15.

MONEY-BACK TRIAL OFFER
Order a trial gallon of each today for testing in your shop. We'll cancel the bill if you're not satisfied.

cut weld cleaning time by 85%

Throw away your cold chisel and whisk off weld spatter with a dry rag! Protect-O-Metal spatter-proofing compounds make weld cleaning a breeze. Improve your welds at the same time . . . P-O-M compounds quiet the arc, improve fusion and electrode operation, prevent oxidation and annealing scale, cause no porosity. No smoke, odors, or fumes.

P-O-M No. 2. Non-inflammable, non-toxic, water-soluble paste. Inorganic. Thin before applying and start welding at once. $3.25 per gallon, f.o.b. Dayton.

P-O-M No. 8. Rust- and corrosion-resistant resin base compound. Comes ready to use. Safe for all metals. Good paint primer; permits outdoor storage of subassemblies. $3.30 per gallon, f.o.b. Dayton.

PROTECT-O-METAL
G. W. SMITH & SONS, INC.
5407 KEMP ROAD, DAYTON, OHIO

Accurate Hole Transfer Made Easy With

NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to ¾" U.S.S. Inexpensive — Last for years.

Write for Circular

NIELSEN TOOL & DIE COMPANY
P. O. Box 1067
Berkley, Mich.

JIG BORING

and

Large Precision Machining

Done to your specifications

We Have 13 Jig Borers

KIDDE PRECISION TOOL CORP.

37 FARRAND ST. BLOOMFIELD, N. J.

MICRO-HEIGHT GAUGE

BY FAIRFIELD GAUGE CO.

NO OTHER GAUGE COMPARES FOR FAST, ACCURATE LAYOUT AND MEASURING

Capacities to 6" when used with this Fairfield Gauge 3" Riser

The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths.

Use as a scriber for fast layout, or insert dial indicator for quick, accurate inspection.

Exclusive distributor for U.S. and Canada:

CLEVELAND INSTRUMENT CO.
735 Carnegie Ave., Cleveland, O.

UNIVERSAL CHUCKS

save time
save money

- low first cost, due to simple design.
- wrap-around gripping action eliminates scored tool shanks.
- precision manufacturing assures tools running true.
- sizes from 1/16" to 1½", shanks to fit any type machine.

Standard Collet Chucks for a wide variety of applications.

Floating Chucks for reaming and tapping.

Coolant-Fed Chucks for deep hole drilling.

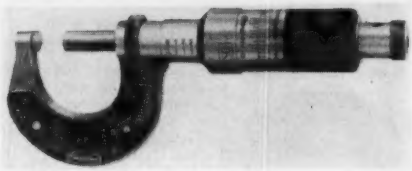
UNIVERSAL ENGINEERING COMPANY

FRANKENMUTH 9, MICHIGAN

173-B

Micrometer Is Marked with Exact Value Graduations for Continuous Flow Reading

Karl A. Neise, 404 Fourth Ave., Dept. MMS, New York 16, N. Y., has announced the Steinmeyer "Microfix" Micrometer which is marked with exact value graduations, providing continuous flow reading and eliminating mental arithmetic. The instrument reads in ten thousandths and is said to be accurate within 0.0001 inch.



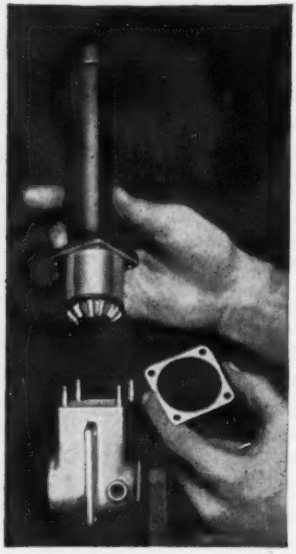
Steinmeyer "Microfix" Micrometer

Tenths are read on the sleeve, hundredths in the window, thousandths on the drum and ten thousandths on the vernier. The barrel and thimble are located on one plane, thus the graduation marks match perfectly, resulting in no uncertainty or varied readings. The ratchet, it is claimed, is well constructed and dependable, affording perfect repetition. The insulated drum grip and insulation plates on the frame minimize hand heat effects.

According to the manufacturer, the instrument opens and closes fast because of special spindle construction. The micrometer is available in various sizes, and the head can also be supplied on special mikes with or without carbide tips.

2 Seconds

CAN SAVE YOU TWO HOURS!



Adjusting bevel gear mesh with a laminated shim is a matter of two seconds to remove a lamination!

The shim in this case is made of LAMINUM®, our exclusive material. It is a "solid" unit built up of 16 layers of .002 brass. It peels quickly and easily. Each shim removed adjusts the bevel gear position by two thousandths.

You save time by easier machining tolerances on the housing; ***you save time*** by eliminating pesky assembly machining; ***you save*** by not tying up a machine intermittently. IT'S EASIER!

LAMINATED SHIM COMPANY, INC.

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SHIM HEADQUARTERS SINCE 1913

Check Our Stampings Division For Your Stamped Parts Requirements

3310 UNION STREET • GLENBROOK, CONNECTICUT

RAPID SET-UPS with extreme accuracy—every time and on the first try!

Brookfield TOOL HOLDER

One Brookfield Tool Holder = One Conventional Tool Holder + Stock of at least 100 Bushings.

In Essence: A Floating, Precision Vise

- Adjustable V Jaw
- Axially True Design
- Balanced-Pressure Locking

No more fussing with bushings . . . just slip tool in jaw and tighten . . . run-out is less than .0001 per inch . . . Brookfield Tool Holders guarantee clean, easy, solid set-ups every time and on the first try! Models available for nearly all automatic and hand screw machines, turret lathes, radial drills, etc. Also useful as Adjustable Steady Rest and Work-Holder.

Write Dept. M for descriptive brochure.

BROOKFIELD, INC. 240 Cushing St. Stoughton, Mass.

Over 85% of the torque wrenches used in industry are

Sturtevant TORQUE WRENCHES

Read by Sight, Sound or Feel

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

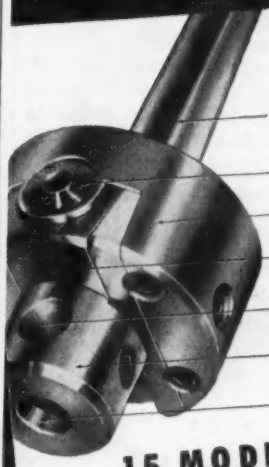
in inch grams
...inch ounces
...inch pounds
...foot pounds

Every manufacturer, design and production man should have this valuable data. Sent upon request.

P. A. Sturtevant Co. ADDISON QUALITY ILLINOIS

FLYNN

FOR 35 YEARS THE LEADING NAME IN BORING HEADS



15 MODELS

Flynn has studied boring head applications for many years—builds a size and design for every job with all the wanted features Machinists with real appreciation for quality and precision prefer Flynn.

FLYNN MANUFACTURING CO.

133 Flowerdale
Ferndale 20, Mich.

Write for our catalog

FLYNN Quality Design

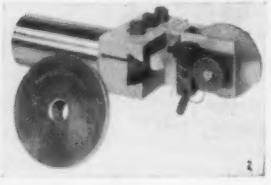
(Advertisement)

Screw Machine Attachment Eliminates Separate Marking Operations

Automatic die marking of part numbers, patent numbers, trade marks, etc., during the operating cycle of automatic and hand operated screw machines, bench and turret lathes, etc., on almost any surface of a part is possible with the complete line of automatic roll markers available from New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit 7, Michigan.

Suitable for both light and heavy work, the markers are practically foolproof and eliminate the need for separate setups for marking, thus reducing cost, scrap, etc. Quick interchangeable roll dies give remarkable versatility and reduce time for setup changeover.

1. Model 500-C for automatically marking on outside cylindrical surface of screw machine parts.

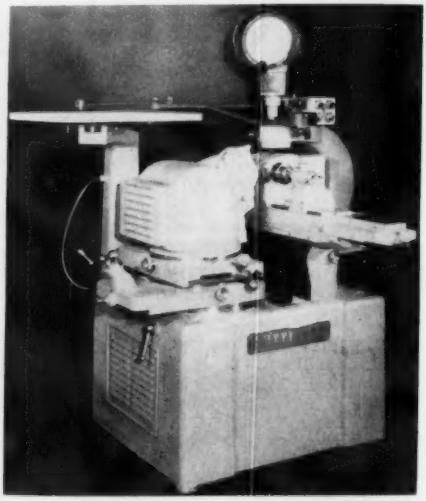


2. Model 600-E for marking on the end face of parts. Normally installed in tailstock of a screw machine or similar position on other machines.

Illustrated are two of the three basic models of the cost cutting markers. Model 700 (not shown) is for marking and cutting off at the same time. The marker occupies the cutoff slide, leaving other stations open for machining operations. New Method also manufactures a complete line of hand stamps, inspectors' stamps, embossing dies, marking hammers, type and type holders, etc. Precision marking and engraving services available.

Machine Grinds Cylindrical Work Up to 8 Inches in Diameter

Designated as the Model No. 123 Micro-Form, a grinder which is designed to grind cylindrical work and circular form tools up to 8 in. in diameter and 8 in. in length has been announced by The Sheffield Corp., Dayton 1, Ohio. The machine can be used to grind forming, beading and seaming rolls and is said to be ideal for grinding intricate and close tolerance profiles on Crushtree grinding rolls.

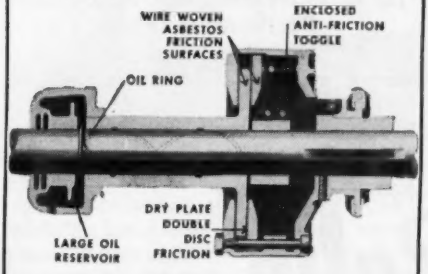


Sheffield Model No. 123 Micro-form Grinder

For circular grinding only, the machine permits finish grinding directly from a drawing, requiring neither templates nor masters. It is available with either a 30-power scope or 30-power combination screen and scope and may be furnished with either live or dead center workheads. The pantograph has a ratio of 50 to 1, and the drawing table will accommodate a 20 x 20 in. drawing.

In addition to grinding work up to 8 in. in diameter and 8 in. in length,

FAST ACTING --POSITIVE CONTROL -- LONG LIFE



This time-tested clutch provides maximum power transmission at lowest cost. For specifications and prices on wide range of sizes, write for Bulletin No. 25M. Brown Engineering Co., 120 N. Third St., Reading, Pa.

BROWN MULE PULL CLUTCHES

BORE HOLES

Also other polynominal profiles—male or female—with taper if required. Less than .020" corner radius; ±.0005" accuracy. For special shapes templates of ¼" nylon can be machined in 15 minutes and re-useable whenever needed. Costly hours reduced to mere minutes with Alina Profile-Boring Head.

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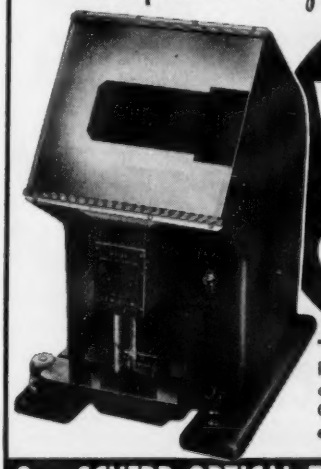
BANSBACH MCHY. CO. 223 N. CICERO AVE. CHICAGO 44, ILL.

A New Concept in Optical Comparator Design...

- *Vertical Design*
- *Erect Image*
- *Eye Level Screen*
- *Horizontal Stage*



new WILDER small parts Comparator model C

An Entirely New Model Optical Comparator Designed for 100% Production Inspection

ACCURATE - FAST INEXPENSIVE

Promotes Inspection Economy

If you manufacture mass produced parts that are now being inspected or should be inspected on an Optical Comparator, the new Small Parts Comparator will enable you to inspect them quickly, accurately and economically at a surprisingly low per-piece inspection cost.

Write for Folder—Code GINZE

Geo. SCHERR OPTICAL TOOLS, Inc. 200-MM LAFAYETTE ST. • N.Y. 12, N.Y.

work up to 10 in. in diameter and 9 in. in length can be swung between the centers of the machine. The maximum size grinding wheel used is 7 inches. Neither the spindle nor the workhead needs be adjusted vertically as both are in a fixed plane. The wheelhead, V-belt driven by 1-h.p. 1,725-r.p.m. ball-bearing motor, provides a spindle speed of 3,000 r.p.m. The gear driven workhead, equipped with change gears, is powered by a 1/3-h.p. 1,800-r.p.m. motor, providing workhead speeds from 40 to 360 revolutions per minute.

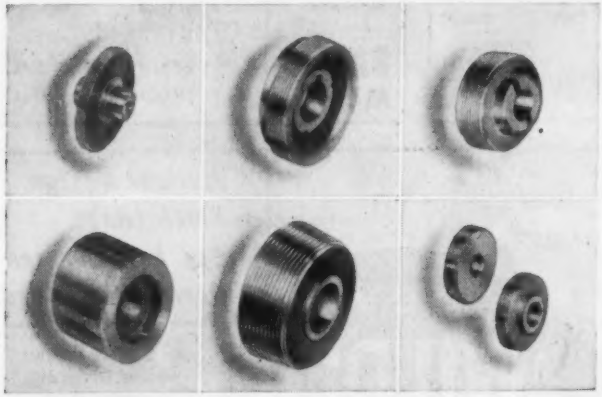
Jig Grinder Features Automatic Positioning Table

The Fosdick Machine Tool Co., Cincinnati 23, Ohio, has announced the Moore-Fosdick Jig Grinder which is the result of combining the unique Moore Jig Grinding Head with the exclusive Fosdick Automatic Positioning Table. This combination, it is claimed, makes it possible to get maximum capacity for precision grinding with the speed and convenience of a table that automatically positions work to a plus or minus 0.0001 inch. The machine is said to be capable of grinding cylindrical as well as conical holes with tapers in either direction. An angular and indexing device built into the main spindle and a slot grinding attachment permit quick, accurate grinding of any contour, either regular or irregular.

The machine utilizes an infinite range of grinding speeds from

Thread Rolls

on automatic screw machines and turret lathes



REED ROLLED THREAD DIE CO.

produce uniform, accurate threads economically

Reed makes special thread rolls of all kinds. Send us samples or detailed specifications of both roll and thread to be produced.

REED ROLLED THREAD DIE CO.

Thread Rolling Machines and Dies, Thread Rolling Attachments, Thread Rolls and Knurls for Automatic Screw Machines and Turret Lathes

WORCESTER, MASSACHUSETTS, U. S. A.

LAYOUT FLUID

FOR ANY METAL

WRITE FOR FREE SAMPLE

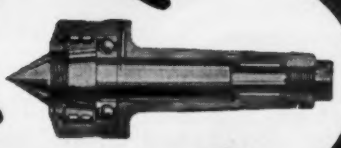
Scribed lines are easy to see against the dark blue background. Speeds up layout work and cuts costs. Merely wipe surface clean and brush on layout fluid. *Dries instantly.* Write on your company letterhead for free sample. Advise us if your local supply house doesn't carry.

DAYTON ROGERS *Manufacturing Company*

MINNEAPOLIS 7, MINNESOTA

NIELSEN

Heavy Duty Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog M on live centers

NIELSEN, INC. LAWTON, MICHIGAN

PRECISION BORING

WITH

MAXWELL MASTUR TOOLS

● Adjustable to 0.0002-inch, the new improved MASTUR boring tools feature precision, speed and long service life. New body and block construction permits these tools to take heavier cuts at higher speeds — to do more work in less time.

Adjusting-screw head is graduated into 50 divisions to provide readings in thousandths, and body is graduated to permit vernier readings of 0.0002-inch. The three models available have maximum boring bar capacities of 1/2, 3/4 and 1-inch and boring range from 3/8 to 15 inches.

088-MC

Write for catalog.

THE MAXWELL COMPANY

325 Broadway • Bedford, Ohio

WHEN YOU WANT WASHERS

Save by buying from

WHITEHEAD

by using Whitehead Stock Washer Dies.

1500 SPECIAL SIZE DIES ON HAND.

Whitehead makes washers and shims from any metal or special material to your specifications. Thickness from .002" to 3/8".

In stock: S.A.E. standard light, medium, and heavy steel washers; brass and copper, small and large patterns; bolt sizes. Write for Whitehead's Catalog.

54-4

WHITEHEAD EST. 1903

WHITEHEAD STAMPING CO.

1673 W. Lafayette Blvd.
Detroit 16, Michigan

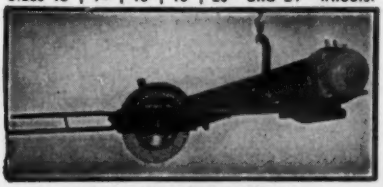
12,000 to 60,000 r.p.m., allowing accurate control of grinding and stock removal. Maximum work size for the jig grinder is 22 x 42 x 27 in. high. The machine also includes four spindle speeds; namely, 90, 120, 180 and 240 r.p.m. Spindle feeds are by air-powered hydraulic control, and travel of the main spindle on the slide is 3⅝ inches. The spindle is adjustable up to 1½ degrees either way or 3 degrees included angle. Included as standard equip-

Moore-Fosdick Jig Grinder

ment are four-speed constant-torque ¼ h.p. motor; wheel dresser; micrometer stop; wrenches; two built-in locating devices; two 1-in. 0.0001 inside micrometers; and two 1, 2, 3, 4, 5 and 10-in. and one 15-in. end measurers in a box. Other features of the machine include adequate way and bearing surface; pressure lubrication of ways; and reciprocating parts are of nitrided steel, hardened to Rockwell C 70. The jig grinder is available in three models.

MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels.



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MUMMERT-DIXON CO.

120 Philadelphia St. • Hanover, Pa.

HIGH SPEED DRILLS

FLAT TWISTED AND ROLLED SECTION

Special Lengths and Types. Prompt Delivery.

Manufacturers Since 1903

HI-DUTY DRILL WORKS

FLEETWOOD, PA.

6" Universal Dividing Head

with

DIRECT INDEXING

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

Write for Folder

CARROLL DIVIDING HEAD CO.

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ROOFE *Heavy Duty* BULL NOSE CENTERS

Two double rows of ball bearings in the large and small ends of this Bull Nose Center mean perfect alignment on any type of work.

Guarantee Perfect Alignment

Two shank sizes provide diameters from ½" to 7½" for a variety of work with a single center. Write for catalog.

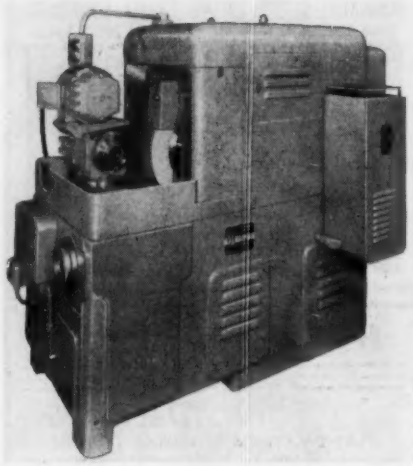
Distributors Wanted.

HOUSTON GRINDING & MFG., CO., Inc.

2110 QUITMAN STREET • HOUSTON 10, TEXAS

Plunge Form Grinder Affords Unusual Accessibility

Jones & Lamson Machine Co., 521 Clinton St., Dept. 710, Sprinfield, Vt., has announced the Model E Automatic High Production Plunge Form Grinder which is said to be compactly designed to afford unusual accessibility and simple setups. The machine can be used for chucking work,



J&L Model E Automatic High Production Plunge Form Grinder

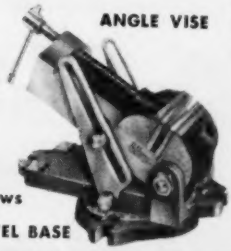
center work or shoe type grinding, or crush wheel or diamond truing, with automatic or manual handling.

The machine has a completely automatic cycle — high speed approach, wheel feed, sparkout and withdrawal are said to be positively controlled through simple cam action, thus ensuring constant, uniform operation. The wheel slide is held against a positive stop with uniform hydraulic pressure for automatic, positive size control. Automatic truing provides controlled dressing, once per piece or once per any predetermined number of pieces. Maximum diameter of swing

NEW NESTING TYPE
TOTE PANS
Sturdy 16 ga. metal. 20" long x 12" wide x 6¼" deep. Drag holes and handles at both ends.
J. L. LUCAS & SON, INC.
Bridgeport 5, Conn.

CAMS
Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.
Your Inquiries Answered Promptly
HIMOFF MACHINE CO., INC.
23-16 44th Road Long Island City 1, N. Y.

ANGLE VISE



4" Jaws with SWIVEL BASE

PALMGREN

for MILLING MACHINES, DRILL PRESSES, GRINDERS, SHAPERS...

Built sturdy and rugged for tough heavy jobs. Accurately machined.

IMMEDIATE DELIVERY

Complete line of Machine Tool Accessories. Write for catalog 202B.

MILLING MACHINE VISE

6" Jaws with or without SWIVEL BASE

CHICAGO TOOL AND ENGINEERING CO., 8383 South Chicago Avenue, Chicago 17, Illinois

DYKEM STEEL BLUE®

Stops Losses making Dies and Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

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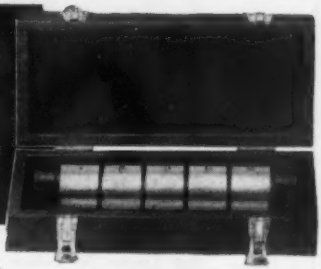
Check Surface Roughness Waviness and Lay INSTANTLY

. . . Right At The Machine



With ACME'S ROUGHNESS COMPARISON SPECIMENS

Available in groups of 3, 5 and 8 specimens. Low cost.

Consists of various surface specimens, *individually finished* to definite micro-inch readings, grouped together in one handy comparison bar. Merely hold bar opposite work for fast, visual comparison check of surface roughness, waviness and lay.

ACME INDUSTRIAL COMPANY

Mfr's. of Drill Jig & Fixture Bushings

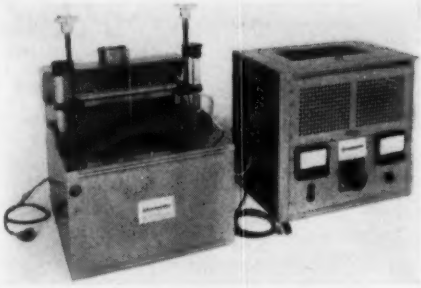
212 N. Laflin St. Chicago 7, Illinois

THE SERVICE SHOP TO INDUSTRY FOR OVER A QUARTER CENTURY

over table is 13 in., and maximum length between centers is either 7½ in. or up to 32 inches.

Unit Deposits Bright, Hard Chrome Plate As Fast As 0.002 In. Per Hour

Designated as the Model 75 "Chromplater," a plating unit which is designed to deposit a bright, hard chrome plate as fast as 0.002 in. per hour on areas up to 25 sq. in. has been announced by The Dawson Corp., 302 Fifth Ave., North Pelham, N. Y. According to the manufacturer, the unit makes use of a hard chrome plating solution which does not require bath adjustment or maintenance throughout the long life of the solution.



Dawson Model 75 "Chromplater" Hard Chrome Plating Unit

The unit itself is a complete package, simple to install and operate, and features a rectifier which embodies all the necessary plating controls. The unit also incorporates a powerstat to control rate, a reversing switch for stripping, a voltmeter and an ammeter. The unit may be operated from a standard 110-volt 60-cycle power source.

The plating unit utilizes a 13 x 13 x 11 in. deep tank, exhaust hood, adjustable work platform and thermostatically controlled electric heater to

QUALITY ACCURACY COLLIS DURABILITY SERVICE

COLLET
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Use-Em-Up Type Drill Sleeves
Use-Em-Up Type Drill Sockets
Standard Type Drill Sleeves
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Short Shank Type Sleeves
Short Shank Type Sockets
B. & S. Taper to B. & S. Taper Sleeves
B. & S. Taper to Standard Taper Sleeves
Standard Taper to B. & S. Taper Sleeves
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Standard tools for all drilling, reaming, and tapping needs and special tools to order. Immediate attention to regular or special requirements.

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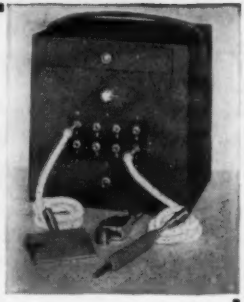
CLINTON, IOWA
Dept. A

DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.
WATTS BROS. TOOL WORKS
Wilmerding, Pa.

MARK IRON, STEEL and CARBIDES



THE Etchograph WAY

Original Electric Etcher, Thousands in Daily Use

Mark *hardened parts*, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

• *Write for circulars and prices.*

BREWSTER-SQUIRES CO.

P. O. Box 191 Tenafly, N. J.

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Bench Type

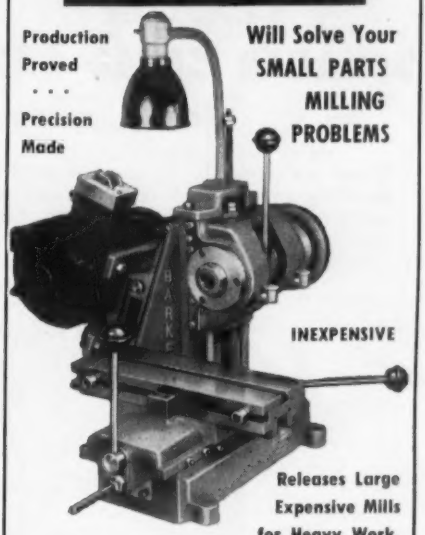
MILLS

with Exclusive

3-WAY* Hand Lever Travel

Production Proved . . . Precision Made

Will Solve Your SMALL PARTS MILLING PROBLEMS



INEXPENSIVE

Releases Large Expensive Mills for Heavy Work.

The Barker Mill was designed and built to sell at the *lowest possible price without sacrifice of quality and the essential features necessary in any machine tool capable of meeting today's stringent production requirements.*

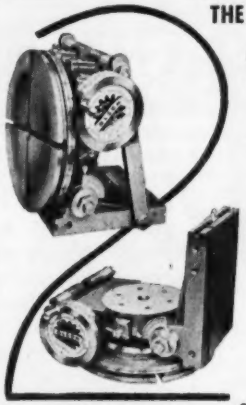
. . . . . .

Write TODAY for New Literature on the BARKER MILL and SPECIAL ACCESSORIES!

BARKER ENGINEERING CO.

500 GREEN RD. • CLEVELAND 21, OHIO

THE TWO IN ONE



COMBINATION ROTARY TABLE AND ANGLE PLATE

PRECISION ACCURACY

WORM adjustable from 0 to 90 degrees.

VERNIER control to within 2 seconds of Arc.

WRITE FOR FOLDER

Makers of Helical Gear Speed Reducers. Worm and Gear Speed Reducers. Standard and Special Gears. Wedge-Lock Turret for Lathes and Turret Lathes.

Open territory available to representatives

OLSON INDUSTRIAL PRODUCTS, INC.

40 W. WATER ST. • WAKEFIELD, MASS.

maintain the plating bath at the most efficient temperature. The Chromplater, it is claimed, has many applications in both tool crib and shop for rebuilding undersize tools, building up worn shafts and die sections, prolonging original life of cutting tools with flash chrome plating and the minimizing of seizure, galling and wear on moving parts. All types of metal may be plated, including sintered carbides and aluminum.

Precision Boring Machine Is Cam Operated

Identified as the Style 312, a precision boring machine which is cam operated and built for such precision finishing work as contouring, boring, turning, facing and grooving has been announced by Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. According to the manufacturer, cam followers impart the rise and fall of the cams directly to the machine table and cross slide, and there are no levers. The machine is designed essentially to accommodate parts that can be rotated on one or more spindles while the non-rotating tools are supported on the cross slide. The machine is said to be ideal for production contouring work in which forms must be reproduced over and over again within close tolerance. Such forms, it is claimed, can be inspected by checking only one dimension; accuracy and relationship of other dimensions are determined by the cams.

The contour form is obtained by the longitudinal movement of the machine table coordinated with the lateral

DEBURRING - -
another
SCHAUER SPEED LATHE job!

These are versatile, economical machines for handling an almost *unlimited* variety of secondary finishing work—deburring, filing, lapping, polishing, etc.—on metal and plastic parts.

Used by leading manufacturers all over the world for increasing production UP TO 90%. Many sizes and models with chuck, collet, expanding mandrel, vacuum chuck and other holding fixtures. Speed *your* production with Schauer Speed Lathes. Get complete information today.

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SCHAUER MANUFACTURING CORP.

4501 Alpine Ave., Cincinnati 36, Ohio

PRECISION PINS

Dowel — Straight
Countersunk — Taper
Made to Blueprint
CENTERLESS GROUND
TO ± .0001" ACCURACY
.030" to .125" Diam.
.125" to 2." Length
Complete Centerless Service
Since 1931

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Standardize on
hall COLLET CHUCKS
for SPEED, ACCURACY, ECONOMY

Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments. All grip ...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

SATISFACTION GUARANTEED!

Made in Two Sizes to Fit Your Requirements:
Model A...1" (max. capacity 1-1/16")
Model B...2" (max. capacity 2-1/16")
Round, square or hexagon collets, plain or serrated
No. 3 Collet Pads Now Available
Write today for illustrated catalog and price list—Dept. B-8.

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622 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

An Award of
CONFIDENCE
in Whitnon
Precision high-production
SPINDLES

For new Surface Grinders or modernizing old machines specify Whitnon Spindles and be confident.

Whitnon Surface Grinder Spindles are precision made for faster stock removal and finer finishes... Ideal for the most unusual grinding applications. Whitnon spindles are dynamically balanced as a complete assembly—skillfully lubricated to guarantee long life under most adverse conditions. Heavy spring preloading prevents all endwise motion or deflection of the rugged alloy shaft.

be confident—count on

The Whitnon
MANUFACTURING CO.
217 High St. New Britain, Conn.

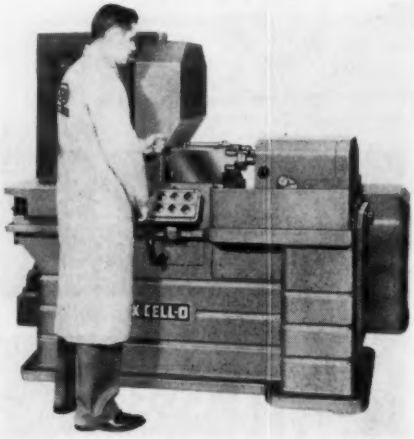
GAMMONS

TAPER REAMERS for all types of die work

- Specially treated for modern die steels.
- Rapid cutting capacity.
- Large range of standard sizes.
- Tapers per inch: .005, .008, .013.

GAMMONS • HOAGLUND CO.
MANCHESTER 2, CONN.
Manufacturers of helical taper pin, chucking, die makers and special reamers.

movement of the cross slide. The table carries the spindles with their drive equipment and is operated in rapid traverse by a pneumatic cylinder cushioned in oil. The feed portion of the table stroke is actuated by a cam opposed by an air cylinder. All cross slide movements are produced in the same manner. Cams are hardened and ground, and are engaged by felt oil wicks to maintain a film of lubricant. Followers are tipped with tungsten



Ex-Cell-O Style 312 Precision Boring Machine in use

carbide. The whole cam assembly is hinged so that it can be swung out of its compartment for changing cams.

Both the machine and the cross slide are supported on flame-hardened ways. These ways are widely spaced and fitted with gibs for maximum stability. A power lubricating system automatically delivers oil to the ways during each work cycle. Between the table and the cross slide is a large, sloping chip chute that is cast integral with the base. There are no obstructions in the chute and no openings whereby chips or coolant can enter the base.

NUMBERALL

Improved TYPE HOLDERS

Hand or Press style. Type can be easily, quickly loaded and unloaded. Simplest construction . . . Just a sturdy pin holds the type securely. No screws nor springs. Super-quality steel type made in various sizes: 1/32" up to 1/2" figures and letters.

Steel Type

Write for Bulletin MS23H

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

TOOL ENGINEERS and TOOL MAKERS

HERE IS A NEW TOOL TO STUDY. HIGHEST STANDARD OF EFFICIENCY AND ACCURACY UNRIVALLED IN PRICE AND VALUE

It's the NEW

MICRO LOCK

QUICK CAMLOCK + MICRO FINE ADJUSTMENT COMBINED

made by the FAMOUS MAUSER

SPECIFICATIONS
Total Length: 9" - Measuring Capacity: 6" - Graduations: 1/1000" & 1/128" - Code Word: GINDO

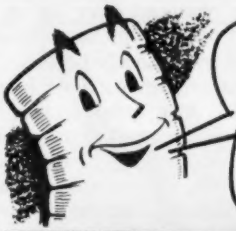
Without detachable Height Gauge Base and Scriber ... $25.00

Same as above but with detachable Base and Scriber - Code GINFU ... $33.00

SOLD ON A 10-DAY MONEY BACK GUARANTEE

Send for Folder - Code GINRE

GEORGE SCHERR CO., Inc.
COMPLETE LINE OF PRECISION INSTRUMENTS
200 MM LAFAYETTE ST. • N.Y. 12, N.Y.



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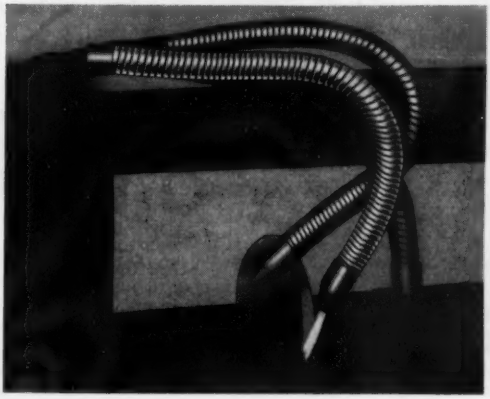
Specify-
UNIVERSAL
FLEXIBLE STEEL
COOLANT NOZZLES



STANDARD ASSEMBLIES available from stock: 1/8", 1/4", 3/8", 1/2", 3/4", male one end, nozzle other end. 6", 9", 12", 15", 18", 24", 30", 36" lengths. Intermediate or longer lengths made to order.

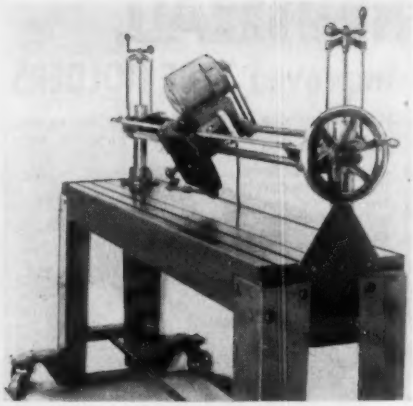
Write for Schedule U-55 for complete data.

UNIVERSAL METAL HOSE CO.

2113 SOUTH KEDZIE AVENUE
CHICAGO 23, ILLINOIS

Machine Cuts and Slices Tungsten, Molybdenum and Other Non-Ferrous Materials

Designated as the No. 11-TM, a wet-type abrasive cutter which is designed to cut and slice tungsten, molybdenum and other non-ferrous materials, as well as refractory materials and glass, has been announced by Eisler Engineering Co., Inc., 734 S. 13th St., Newark 3, N. J. The machine is said to be well suited for making accurate longitudinal cuts on bars, tubes and sheets. The workhead carries a 12-in. diameter x $\frac{1}{16}$-in. thick cutting wheel operating at 1,720 r.p.m. The workhead is powered by a ¼-h.p. motor, slides on two 1¼-in. diameter bars and can be cranked over an effective distance of 42 inches. The travel is effected by a handwheel and feed screw which engages a half nut on the workhead. For quick return, the half nut is disengaged from the feed screw and the workhead can be easily moved back by means of a handle. The workhead can be tilted and locked at any angle from vertical to horizontal, and a protractor indicates the angle.



Eisler No. 11-TMM Abrasive Cutter

The table measures 7½ ft. long x

The tips *swivel* after the flame is lit! Look what that means: You can change the working angle of your torch in a split second without any loss of time. No more wasting time shutting off the gas, looking for wrenches, lighting up again.

Ask us about it — drop us a card.

SMITH WELDING EQUIPMENT CORPORATION

Dept. MMS-121, 2633 S. E. 4th St., Minneapolis, Minn.

CUT TOOL COSTS

broken tools made like new again with NU-TANGS*

Twisted or broken tangs replaced at low costs on any tool with a Morse Taper (sizes 1 to 6) Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

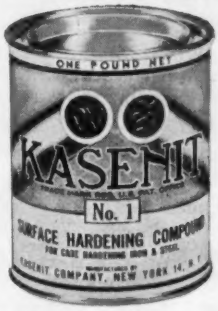
NO WELDING! NO SLEEVES!
NO SHORTENING! NO DISTORTION!

Send them to us like this! GUARANTEED STRONG AS NEW! *We return them like this!*

* Patent No. 2,512,033

NU-TANGS INC. 1339 Bates Avenue Cincinnati 25, Ohio

CASE HARDENING



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Non-Inflammable

5-lb. can $9.25 plus postage

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799 GREENWICH ST., NEW YORK 14, N. Y.

Benders

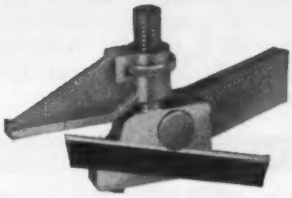
Although this Fisher Bender, or Metal Lathers Bender, as it is also known, was designed primarily for the lathing trade, it is used by many different concerns who need a well-made and easy to operate bender of the following capacity:

7/16" round or square iron.
2" x 1/2" channel iron.
2 1/4" x 5/16" flat iron cold

Send for catalog sheets on our complete line.

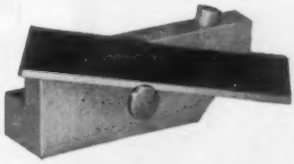
T. H. LEWTHWAITE MACHINE CO., INC.
317 EAST 47TH ST., NEW YORK 17, N. Y.

See THESE AIDS TO TOOLING EFFICIENCY!



FLOATING CUT-OFF TOOL FOR LATHES

Solves the problem of cutting off in a lathe. Has a steady-rest that holds the blade on the centerline of work. Prevents tool from chattering or digging into stock. Has specially designed free-cutting blade.



CUT-OFF TOOL FOR SCREW MACHINES

Has free-cutting blade of special design. Supports the blade right up to extreme front edge of holder, eliminating chatter.

SQUARE SLOTTED SLEEVE REDUCES TOOLING COSTS

Saves time and expense of broaching square holes when installing tool bits in boring bars, tool holders and cutter heads. Sizes for square tool bits: 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" square.

Write for Literature

Novi Tool & Machine Co.
25806 Novi Road **Novi, Mich.**

18 in. wide and is 32 in. above the floor. A splash pan fits under the table and extends all around to collect the coolant and to return it to the settling sump. Coolant, usually water, is recirculated from the sump and particle separator. The table top has three longitudinal slots, one to provide clearance for the cutter wheel and two (T-slots) for hold-down clamps and fixtures. Several types of cutting wheels are available.

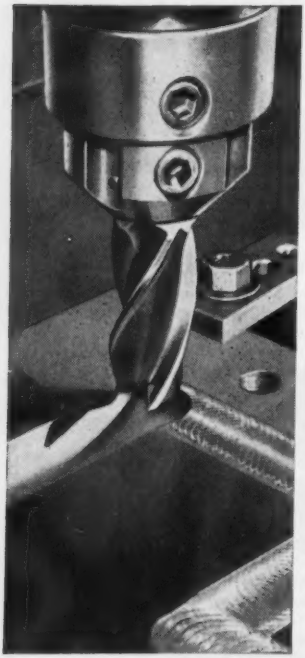
Lathe Is Designed for Automatic Loading, Automatic Chip Removal and Maximum Carbide Performance

An automatic lathe which is designed for automation, maximum carbide performance, remarkably high rates of metal removal and automatic chip removal has been announced by Hydra-Feed Tool Corp., South Norwalk, Conn. With the lathe, the direction of rotation is reversed from normal practice, making possible the elimination of all the usual tooling from the front of the machine and providing a completely unobstructed loading area. Reversing the rotation causes tool pressures on rear tools to be "downward" instead of "upward" as on conventional automatics, thus permitting full advantage to be taken of the massive and rigid base of the machine to provide smooth, powerful cutting at high speeds. With the reversed rotation and elimination of the usual front carriage, chip flow is said to be unobstructed through the full width, full depth

YESTERDAY'S PIONEER . . . TODAY'S LEADER

NEW HEAVY DUTY END MILLS and HOLDERS

(Both are Stock Items)



● Look at this rugged 2" diameter Weldon end mill with 4" long flutes which made a 2½" deep cut in a solid block of die steel—4140 steel heat treated to 260 Brinnell. The feed was 1½" per minute, and the material was removed at a rate of 7½ cubic inches per minute.

This HEAVY DUTY Weldon end mill is held by a new-style end mill holder which bolts securely on to the nose of the milling machine spindle. The holder, located by a centering plug, is driven by two drive keys on the spindle nose. The 2" diameter shanks of these heavy-duty end mills are securely held by two large hollow head screws.

For top performance and sturdy long life in end mills—large or small—look to Weldon.

Weldon distributors throughout U. S. A. and Canada carry complete stocks to serve you.

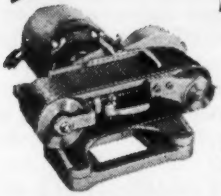
SEND FOR LATEST CATALOG NO. 10

THE WELDON TOOL CO. Cleveland 4, Ohio

3000 WOODHILL ROAD

DOES IT BETTER
DOES IT FASTER

SIMPLEX-M
ABRASIVE BAND GRINDER



The precision of a machine tool plus the durability of a workhorse. Complete with ½ H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

OTHER STYLES AND SIZES IN NEW MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.
333 Nassau Avenue, Brooklyn 22, N. Y.

Sensational new
VIBRA-FORGE principle assures unbreakable welds every time!*

BREN WELD
PORTABLE BAND SAW BLADE
WELDER
...With Built-in Grinder
3/4" capacity

If you've been troubled with band saw blade breakage investigate this Bren/Weld unit built on the new Vibra-Forge principle. It gives you:

- PERFECT WELDS.
- NO BREAKAGE.
- NO FAILURES.
- WEIGHS ONLY 35 LBS.
- OPERATES ON 110 V, AC.
- UNCONDITIONALLY GUARANTEED.

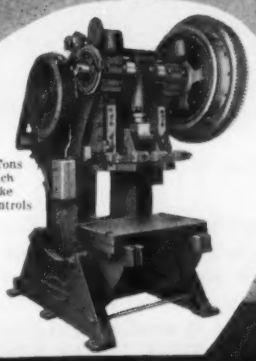
LIST $169.50 PRICE

Write today for complete details

*Pat. appl'd for

Mfg'd by Brennen, Bucci & Weber, Inc., N. Y. C.
SALES DIVISION
KASSON DIE & MOTOR CORP.
Integrity Since 1919
32-14 Northern Blvd., Long Island City 1, N. Y.

Backed by nearly a half century of dependable performance
. . . yet modern to the minute for today's exacting demands.



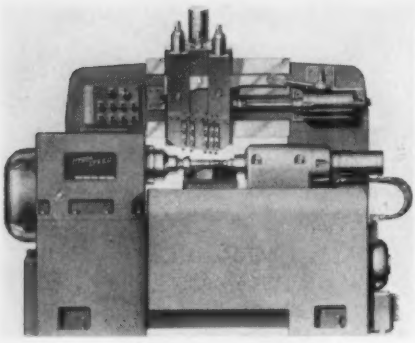
A5—88 Tons
Air Clutch
Air Brake
Electric Controls

- Engages smoothly; no sledge hammer blow.
- Inched, single stroke, or continuous.
- Less heat as brake is released when clutch is engaged.
- Less current used; brake is off when clutch is engaged.
- Clutch torque output in direct ratio to applied air pressure and controlled by regulator valve.
- Two run buttons, one stop button, one inch button operate on 110 volt regardless of motor current (220 or 440).
- No back lash when using air cushion or heavy spring pressure pads.
- Clutch is reversible. (By reversing wires on motor you can inch out of stall).

Robinson Presses are available (in either pin type or air clutch models) in sizes from 32 to 88 Ton.

Write for illustrated brochure and specification sheet.

ROBINSON PRESSES
NEW ALBANY MACHINE MFG. CO.
NEW ALBANY, INDIANA



Hydra-Feed Model HP-8 Automatic Lathe

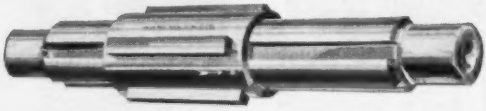
chip chute which is provided. A large opening in the rear of the bed facilitates the easy installation of automatic chip removal equipment.

The lathe is available in four models; namely, HD-8, HD-12, HD-16 and HD-24. Spindle speeds are infinitely variable and range from 82 to 2,400 r.p.m. on the Model HD-8, from 98 to 1,475 r.p.m. on the Model HD-12 and from 66 to 1,072 r.p.m. on the larger models. The tool blocks and slides, as well as the workpiece, are in easy reach of the operator for accessibility in making any needed adjustments, even where multiple tooling and slides are employed. The hydraulically operated carriages and slides can be set to perform automatically practicaly any combination or sequences of operations. Each carriage or slide may be operated independently through a selector switch and push buttons on the single central control panel. Automatic cycling is provided when desired, permitting consecutive roughing and finishing of parts in the same setup and the same tooling without stopping the machine. Either cam control of the carriage and slide or tracer operation are available. Rear as well as top carriages can be adapted for longitundinal feeds.

SET OF

14 Nicholson Mandrels

Takes Every Size Bore ½" to 7"



Actually 209 solid arbors would be required to fit all bores between ½" and 7", advancing by 1/32". But 14 Nicholson Expanding Mandrels will accommodate this entire range, and all in-between sizes as well. Hardened tool steel. Sold singly or in sets. The standard in shops the nation over. BULLETIN 653 shows how to save time, promote precision with these widely used tools.

136 Oregon St., Wilkes-Barre, Pa.

W. H. NICHOLSON & CO.

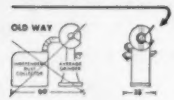
TRAPS · VALVES · FLOATS

Hammond of KALAMAZOO

2 IN 1

NO-DUST GRINDER

SAVE OVER 50% FLOOR SPACE THE HAMMOND WAY



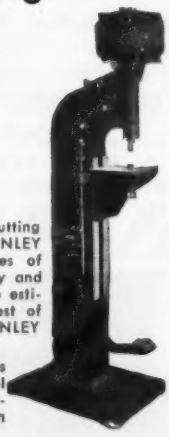
DUST-LADEN AIR IS A MENACE!

- Protect your employees' health.
- Protect nearby machine tools from dust and grit.
- Save floor space — requires only 6⅓ square feet. For 10", 12", and 14" wheels. Write for Catalog.

Hammond Machinery Builders, Inc.
1615 Douglas Ave., Kalamazoo 54, Michigan
See us at Booth 1142—National Metal Exposition

Rivet Spinning on the LINLEY

is fast, low in cost and noiseless



Save time and money by putting your riveting on the LINLEY RIVETER. Send us samples of your work and we'll gladly and without obligation give you estimates on the time and cost of handling your work the LINLEY way.

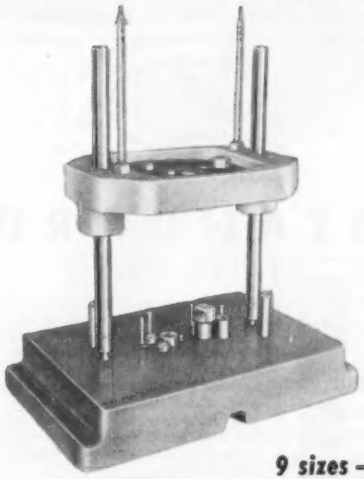
Available in sizes and types for iron and cold rolled steel rivets up to ⅜"; larger rivets of softer materials can also be handled.

Send for Bulletin R TODAY!

LINLEY BROTHERS CO.
671 State St. Ext., Bridgeport 1, Conn.

Zagar Self-clamping DRILL JIGS

NOW STANDARDIZED for DRILLING, REAMING, TAPPING



9 sizes — 5 combinations per size — for hole patterns 3" through 15" dia.

Standardization makes for quick delivery and attractive price. Only a few minor parts need be made. Speed up machining operations. The operator merely feeds the parts — the Zagar Self-clamping Drill Jig does the rest. Zagar drill jigs are now "off the shelf".

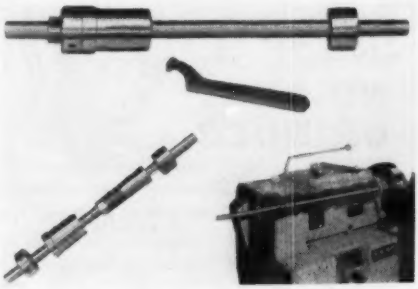
Write for bulletin "S-10"

ZAGAR TOOL, INC.
24000 LAKELAND BLVD., CLEVELAND 23, O.

Zagar TOOLS For INDUSTRY and SPECIAL MACHINERY

Spindle Stop Can Be Used on Any Attachment or Fixture Employing Draw Bar

A spindle stop which is designed to be used on any attachment or fixture that employs a draw bar has been announced by Tage Anderson Machine Works, 1126 Kishwaukee St., Rockford, Ill. The unit is available in a complete range of sizes to fit any common lathe spindle, and the size of stop is determined by the diameter of the lathe spindle. Consisting of only four parts (main body, body nut, body sleeve and guide bushing), the



Anderson Spindle Stop

spindle stop, it is claimed, can be installed quickly and easily. According to the manufacturer, the stop may be used with collet as well as chuck or face plate adaptations; allows work to be held to full depth of hollow spindle; prevents spindle distortion; and allows accurate duplication of production pieces. The design of the spindle stop is said to minimize position change in collet when drawn.

Rotary Table Can Be Revolved By "Flick of A Finger"

A rotary table, identified as the "Air-Lift," which is said to be capable of being revolved by a mere "flick of a finger" has been developed

MARK OF QUALITY

STANDARD

TAPER PINS

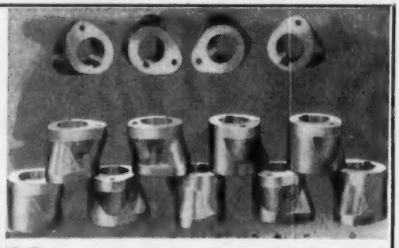
● The high quality and accuracy of Standard Steel Specialty Taper Pins have won them wide acceptance. Milled from bar stock, straight to taper and to extremely close tolerances, these pins give 100% performance. The uniformity and accuracy of the pins saves valuable time at assembly, assuring you trouble free service.
Write for complete catalog giving information on taper pins. Woodruff keys, machine keys and machine racks.

STANDARD STEEL SPECIALTY CO.
BEAVER FALLS • PENNSYLVANIA
Plants: Beaver Falls, Pa.; Hammond, Ind.

Rowbottom for Cams

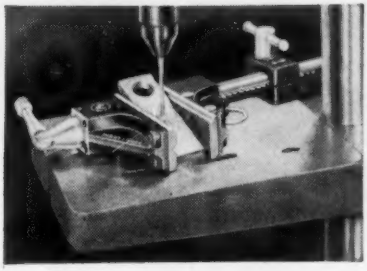
Specialized Production, Lower Costs

Send us your drawings or specifications . . . ask for estimates on producing your cams on a contract basis. You'll be interested . . . in our speed and savings.
(Right) Diesel Engine Cams produced by Rowbottom.



THE ROWBOTTOM MACHINE CO., Waterbury, Connecticut
Also Cam Milling and Cam Grinding Machines. Ask for details.

Twin Time and Money Savers!



WAHLSTROM Instant-Change **CHUCK** saves up to 95% of tool-change time! Spindle never stops. Requires no keys, collets or wrenches. Self-centering jaws automatically grip without slip, do not chew up drill shanks. No other chuck like it!

FLOAT-LOCK SAFETY VISE instantly grips or releases work of almost any shape for SAFE drilling in any position. Prevents accidents and minimizes drill breakage. Also serves as base for low-cost jig. Comes with 9" or 12" jaw openings. Also model for band saws.

Ask your distributor for a demonstration or write us for folder W-50.

WAHLSTROM/FLOAT-LOCK SALES DEPT.
AMERICAN MACHINE & FOUNDRY COMPANY
Room 21, 261 Madison Ave., New York 16, N. Y.

Another AMF Product

WAHLSTROM Chucks
Float-LOCK Vises

HIGHER SPEEDS! FASTER GRINDING!

kipp

AIR GRINDERS

MODEL JA
50,000 R.P.M.
$42.00
IN U.S.A.

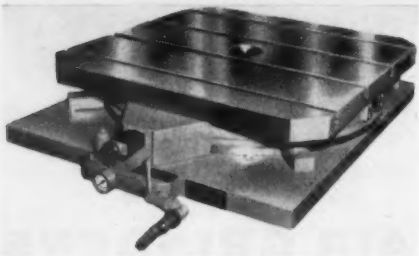
Weight 12 ounces; length 6¼ inches; chuck size ⅛ inch. Wheel guard removed for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

kipp

MADISON-KIPP CORP.
208 Waubesa St., Madison 10, Wis., U.S.A.



G&L "Air-Lift" Rotary Table

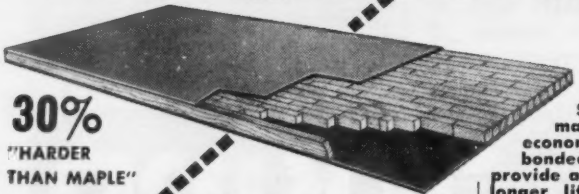
by Giddings & Lewis Machine Co., Fond du Lac, Wis. The table is a completely self-contained unit with no complicated pieces to assemble or misplace and is claimed to be unusually useful for operations where more than one surface of a workpiece is to be machined.

The rotary table contains a collapsible index pin which is said to eliminate all play or lost motion in the mechanism and compensates for any wear which might take place. The plunger can be firmly locked in the table and index block every 90 degrees for positive indexing. Graduations are used for positioning between these 90 degree intervals.

The table can be quickly and easily revolved. By turning a valve at the base of the platen, air is forced into the unit, raising the table approximately 0.001 inch. With the air acting as a bearing, the table actually "floats on air" and can be indexed to the desired position by simply turning the table by hand. Off-center loads can be easily and accurately indexed with the table.

After the proper indexing position has been reached and the air valve has been closed, the table firmly settles on a plain non-lubricated seat making it easy to clamp and hold the table in position. The table can be provided with round or square platens.

NEW!
WORKBENCH TOP
....RESINWOOD
ShopTop



For All Industries
TOUGH WARP-FREE
SPLINTER-PROOF

30%
"HARDER THAN MAPLE"

ShopTop quality is superior to maple — with up to 50% greater economy. Select kiln-dried cores, bonded under pressure and heat, provide a built-in impact cushion to give longer life. Smooth Resinwood facings resist acid, alkali, oil, and grease. For new or replacement work benches. Made in any size to meet your requirements.

Available through selected industrial distributors in principal cities or write direct for sample and price list.

QUALITY RIMCO 1868 MILLWORK

ROCK ISLAND MILLWORK COMPANY
RESINWOOD DIVISION
Established 1868
Rock Island 6, Illinois

Production Line Analysis PROVES
SECOMET DIAMOND WHEELS

- GRIND FASTER
- LAST LONGER
- REDUCE OVERALL COSTS

In a four month period under actual competitive conditions one Diamond Wheel ground 36,976 pieces, while eight silicon carbide wheels ground a total 16,023 pieces.

RESULT— 1. Less cost per piece 2. Greater Production 3. Less down time.

See for yourself how
SECOMET DIAMOND WHEELS
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Send for informative catalog #54 or contact us direct for information and assistance.

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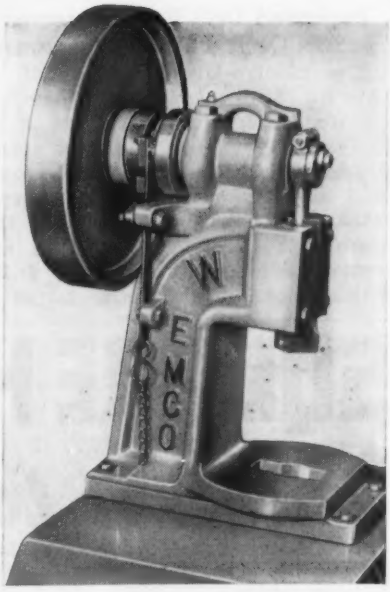


EMCO "W", bench type, 5-ton; also larger EMCO "X", 10-ton. Both sizes also stand-mounted. With or without motor drive.

EMCO POWER PUNCH PRESSES
are SPEEDY and SAFE

Versatile EMCO presses excel for punching, forming, stenciling and riveting metal, leather, plastics and other non-metallic materials. Up to 300 operations per minute. "Big machine" speed, strength, rigidity, accuracy, endurance. Compact, fool-proof; simple design—easy to operate. Thousands of EMCOS in money-making use testify to Klaas' dependability since 1921.

Ask for our Bulletin "S-10"

UNUSUAL AIDS TO INDUSTRY

THE KLAAS MACHINE & MFG. CO.
4334 East 49th St.
Cleveland 25, Ohio

KLAAS-BUILT

Improved Drill Press Features Special Quill Feed Arrangement

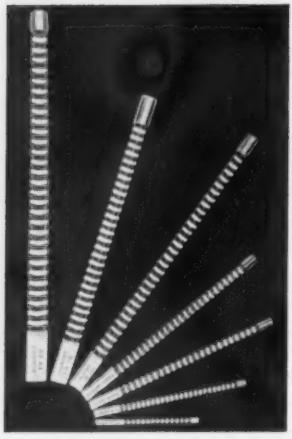
The Electro-Mechano Co., 265 E. Erie St., Milwaukee 2, Wis., has announced several improvements in its line of 8-in., manual feed, high speed, precision drill presses. A special quill feed arrangement has been incorporated in the machine, enabling the operator to properly feed both extremely small and larger size drills. Either feed is said to be instantly available by a simple engagement mechanism. The standard feed is used for drills from No. 60 to 5/32 inch. "Micro-feed," a method of feeding through a four-to-one reduction, is said to allow for a fine or very slow feed for drills down to 0.004 inch. This slow speed, it is claimed, removes the necessity of feeling the drill bite and makes drilling a simple mechanical movement of the feed knob. The quill return counterbalance has been changed from an arm to pulley and weight arrangement.

Spindle speeds ranging from 1,000 to 10,000 r.p.m. or from 2,500 to 15,000 r.p.m. are available. The machine utilizes a speed control which is said to maintain exactly the desired drill speed, load or no load. The spindle speed is set by the movement of a lever on the front of the unit.

Electro-Mechano Improved Precision Drill Press

SQUARE HOLES

Quick—at Low Cost



New

du Mont *Minute Man* High Speed Steel Square Broaches finish cast or drilled holes *in one pass,* using arbor or hydraulic press. Available *from nearby stock* for 3/16" to 3/4" squares AT UNBELIEVABLY LOW PRICE. Clip coupon and see for yourself.

The du MONT CORPORATION, Greenfield, Mass.

Please mail Data Sheet and Price List "S" and the name of nearest stocking distributor of the new Minute Man Square Broaches to

Name.....

Company.....

Address.....

Looking for

a WIDER SELECTION?

ACE has just what you are looking for—*the finest Drill Bushings ever made!* Now over 22,000 A. S. A. and other standard sizes *plus specials.* Also hexagon, knurled or serrated bushings for use in soft or castable materials.

Always Specify Ace!

ACE DRILL BUSHING CO., INC.

5407 FOUNTAIN AVENUE
LOS ANGELES 29, CALIF.

TAP® MAGIC

A Compound for

Tapping • Threading • Drilling • Reaming

NOT A CUTTING OIL!

SPEEDS Tapping and Threading
CUTS Clean Threads **STOPS** Tap Breakage
FREES Stuck Taps Instantly

EFFECTIVE ON ALL METALS

Alloys . . . Castings . . . Aluminum . . . Brass
Magnesium . . . Bronze . . . Titanium . . . Stellite
Steel (Mild, Normalized
Stainless, Tempered)

A standard 4 oz. can Postpaid $1.00 and the name of your local supplier

DISTRIBUTORS AND JOBBERS:
This is Fast Moving . . . Repetitive Merchandise

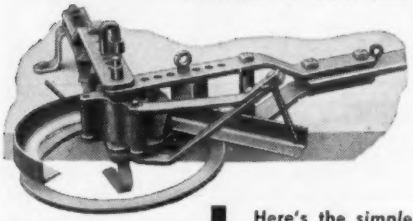
SMITH TOOL & ENGINEERING COMPANY
A Division of Smith Cage Yucaipa, Calif

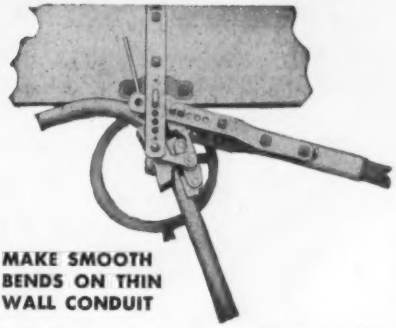
one man one bender

HOSSFELD UNIVERSAL® IRON BENDER

***with* HYDRAULIC ATTACHMENT**

BEND Angle Iron INWARD or OUTWARD





MAKE SMOOTH BENDS ON THIN WALL CONDUIT

Bends Flat, Round, Bar, Angle and Pipe

Here's the *simple* solution to two of your most difficult bending problems . . . angle iron and conduit. These *special* attachments for your HOSSFELD Iron Bender bend these *special* materials neatly, quickly, accurately to your exact specifications . . . a smooth, easy, one-man operation. Ask about the HOSSFELD Hydraulic Attachment that gives you complete mechanical operation.

GET ALL THE FACTS! WRITE TODAY!

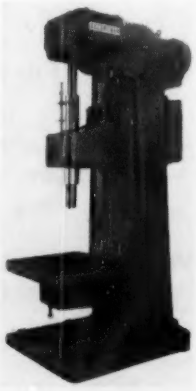
HOSSFELD MFG. CO.

402 W. 3RD STREET • WINONA, MINNESOTA

Drilling Machine Is Completely Automatic

A completely automatic, electromechanical drilling machine has been announced by Cleereman Machine Tool Co., Green Bay, Wis. Designated as "Series A," the machine is available in two models; namely, the Model AD which performs automatic drilling and the Model ADT for automatic drilling and tapping. Automatic, push-button operation has been achieved by the application of a simple, positive design. According to the manufacturer, the general arrangement and automatic features of the "Series A" make the machine adaptable for the highest degree of automation and so basically universal in application that it can easily handle smaller lots of parts.

Both models are completely automatic with the cycle being controlled by dogs. An individual set of dogs for the feed cycle with a micrometer depth control dog and an individual set of dogs for power rapid traverse approach and return are used. The automatic cycle is initiated by touching the cycle button which is normally located at the front of the adjustable spindle. Each machine is wired so a foot

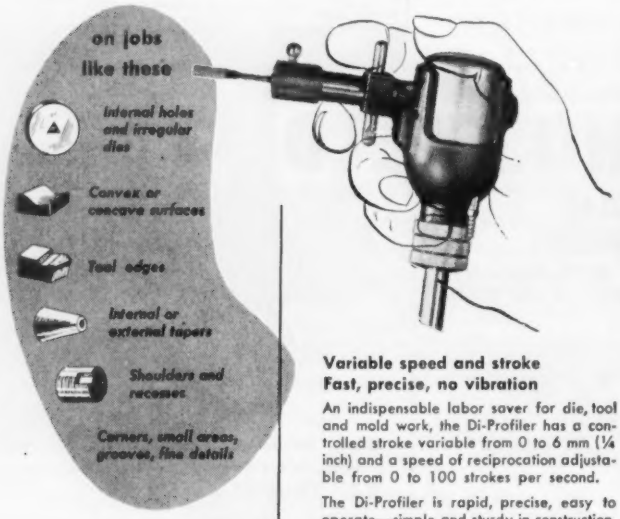


Cleereman Model ADT Automatic Drilling and Tapping Machine

THE **Di-Profiler**

RECIPROCATING HAND MACHINE

for time-saving cutting—roughing—finishing


on jobs like these
Internal holes and irregular dies
Convex or concave surfaces
Tool edges
Internal or external tapers
Shoulders and recesses
Corners, small areas, grooves, fine details

Variable speed and stroke
Fast, precise, no vibration

An indispensable labor saver for die, tool and mold work, the Di-Profiler has a controlled stroke variable from 0 to 6 mm (¼ inch) and a speed of reciprocation adjustable from 0 to 100 strokes per second.

The Di-Profiler is rapid, precise, easy to operate—simple and sturdy in construction. Its weight of less than one pound and freedom from vibration eliminate fatigue and assure perfect control for the most intricate work.

Moderately priced, the Di-Profiler pays for itself many times through time-saving cost reductions.

Write for free demonstration or illustrated price list DS-1054

Tools for every type of work
CUTTERS, FILES, DISCS, POINTS, BURRS, LAPS, SCRAPERS

ENGIS EQUIPMENT COMPANY
Sole Authorized Distributor for the United States
431 S. Dearborn Street, Chicago 5, Illinois

ETALON No. 9

$40.00

F.O.B., N.Y.

HARDENED STAINLESS STEEL

Overall Length 12"

Measuring Capacity 8½"

World famous for accuracy. Hand fitted Vernier slide insures smooth, snug operation. Wide Vernier, exceptionally easy to read. English or English and Metric graduations. LENGTHS UP TO FIFTEEN FEET

Handsome, form-fitting wooden case.

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Fully Guaranteed

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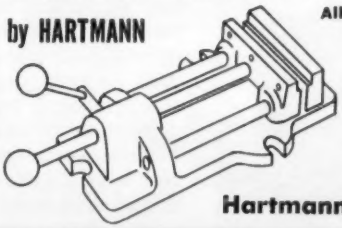
INSTANT ACTION

by HARTMANN

RAPIDSET

All Purpose Tool Room And Machine Shop Vises.

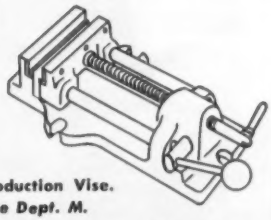


The

JAWSET

Adjustable Pressure Production Vise.

For Information Write Dept. M.



Hartmann Mfg. Co., 1637 Goold St., Racine, Wis.

NEWEST DEVELOPMENT IN PRECISION BORING BARS

NEW "BH" BORING BARS are designed to overcome the major disadvantages of conventional bars:

- **Both clamp and insert are serrated to insure the firmest grip possible, even with little pressure on the clamp.**
- **New advanced clamp design eliminates strain on the inserts and prevents breakage of tool bits.**
- **Carbide and HSS inserts have a half-elliptical shape for better side clearance and more strength, less chatter.**

Serrated HSS or Carbide Tool Bits

Write for free catalog to:

R. B. TOOL CO., INC.

784 North Broadway
White Plains, N. Y.

IN CANADA:
CANADIAN M.S.E.
171 Kipling Ave. S.
Toronto 18, Ontario

switch or auxiliary push buttons can be mounted wherever required or wherever is most convenient for the operator. Fixture interlock switches can also be used. The automatic cycle on the Model AD is power rapid traverse approach, feed and power rapid traverse return. In addition to this cycle, the Model ADT has power rapid traverse approach, tap in, tap out and rapid traverse return for tapping operations.

Each model has a broad range of speeds and feeds. Speed range is approximately 60 to 1,725 r.p.m. with a feed range from boring feeds of approximately .003 in. per revolution up through a full range of drilling and reaming feeds to .250 in. per revolution. All standard pitches of tap leads up to ¼ pitch are available. Normal equipment is 10-h.p. drive and No. 5 Morse taper spindle. Various designs of flanged spindles for multiple spindle heads can be supplied. Single spindle models are available, as well as multiple spindle and gang drill types, and the standard top section unit can be furnished alone for mounting on other equipment.

...for triangular, round & square carbide inserts

Newcomer Econo-Clamp Tool Holders provide a short-cut to economical production . . . machine down-time for tool grinding is minimized because multiple cutting edges on inserts can be utilized! Positive dual clamping features provide easy, quick and accurate indexing.

Econo-Clamps use standard full-length inserts or the more economical, short Newcomer "Throway" Carbide Inserts together with a hardened steel base anvil.

Newcomer Ad-Clamp Tool Holders are also available for use with standard rectangular blanks or the more durable Newcomer Step-Tip Blanks.

Send today for Newcomer Catalog 109-54!

NEWCOMER PRODUCTS, INC.
LATROBE, PENNSYLVANIA
General Sales Office: 512 Franklin Ave., Pittsburgh 21, Pa.

Magnetic Base Lighting Unit

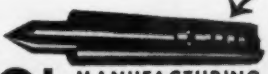
Enco Mfg. Co., 4524 W. Fullerton Ave., Chicago 39, Ill., has announced the "Tiny-Titan" No. 250 Portable Heavy-Duty Duplex Magnetic Base Lighting Unit which accommodates up to a 100 watt standard bulb and which can be positioned to every possible angle in hard-to-light places. The unit consists of a light, a ball and socket flexible stem assembly and a

COMPENSATING LIVE CENTER

Eliminate "Cold Welding" of your center. Use the accurate, rugged, reliable *NIROL. The spring loaded Live Center that compensates for expansion and contraction in high speed operations.

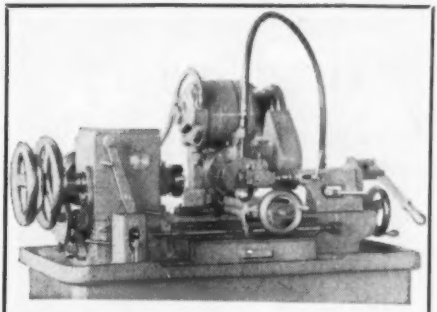
Write for complete information.

*Reg. U.S. Pat. Off.



*NIROL MANUFACTURING COMPANY

901 H'WAY 22, N. PLAINFIELD, N. J.



IMPROVED WALTHAM THREAD MILLER

"Send for new sheet illustrating the machine with complete pedestal and describing the improvements."

WALTHAM MACHINE WORKS, INC.

BOX 48 • WALTHAM, MASS.

Commander SELECT A SPINDLE

DUAL SPEED DRILL PRESS TURRET

DRILLS, REAMS, TAPS ON 1 DRILL PRESS SPINDLE!

• Fits Any Drill Press • Increases Production

• Reduces machine, fixture costs

Commander Select-A-Spindle permits you to do 3 operations on a single drill press spindle . . . save time . . . eliminate multiple handling of piece parts, speed production and reduce overall costs. Dual Speed Select-A-Spindle permits selection of proper speed for each operation. Quick, positive hand indexing positions each tool accurately for sequence operations. Select-A-Spindle is built to tap with any 1, 2, or all 3 spindles to the full capacity of the unit. Adjustable torque control spindles for protection of taps to ¼" available.

Write for illustrated circular on Select-A-Spindle, other Commander Production Tools and name of your nearby Commander Distributor

Commander MFG. CO.

4224 W. KINZIE STREET, CHICAGO

PRODUCT OF COMMANDER BUILDER OF PRODUCTION TOOLS

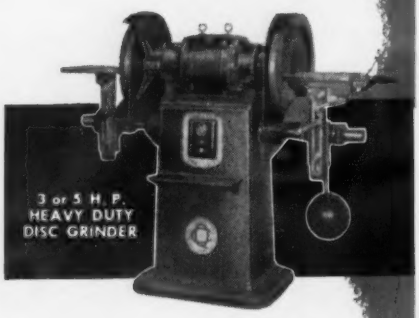
SEE US AT BOOTH 1309, NATIONAL METAL SHOW, CHICAGO

"Time Savers in any shop"

QUEEN CITY

heavy duty

DISC GRINDERS and BUFFERS



Queen City Heavy Duty Disc Grinders and Buffers are designed for the hardest use. Extra heavy spindle, large, high quality ball bearings and special duty motors all contribute to long, trouble-free service.

The complete range of Queen City Grinders and Buffers . . . floor and bench types . . . in sizes from ⅓ to 10 H. P. . . . is described in a free 24-page catalog.

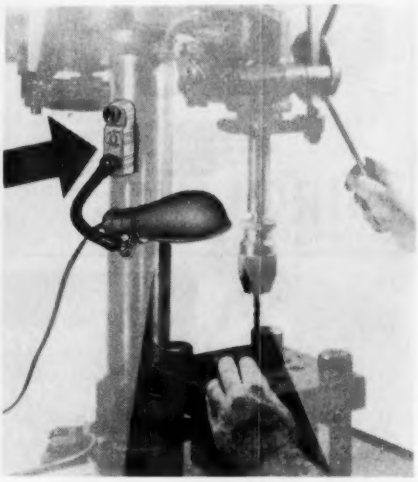
Write for detailed literature

QUEEN CITY MACHINE TOOL CO.

QUEEN CITY MACHINE TOOL CO
3911 Kellogg Avenue,
Cincinnati 26, Ohio

"Queen City Grinders—Famous For Over 50 Years"

magnetic base. The lamp socket is made of aluminum and is equipped with a shield, the exterior of which is red-rayon-flocked to resist heat and protect the user's eyes. Eight feet of oil resistant cord with plug-in is included. The unit operates on 110 volts, a.c. or d.c. The ball and socket flexible stem assembly is said to provide for minute positioning to every possible angle quickly and easily. The flexible stem is 9 in. in length and ⅝ in. in diameter and is constructed of



Enco "Tiny-Titan" No. 250 Duplex Magnetic Base Lighting Unit installed on drill press

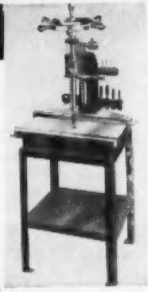
flat spring wire wound around a coil spring.

The magnetic base has sure-grip non-breakable plastic base measuring 1¼ x 4 x 1⅝ in., with steel parallel ribs on the bottom for providing magnetic contact. The base is equipped with a jack-type release and positioning screw which enables the user to change the unit from one location to another quickly and easily. The base provides a 125-lb. magnetic pull and can be mounted to rods as small as ¾-in. diameter.

. . . for more than 1001 jobs

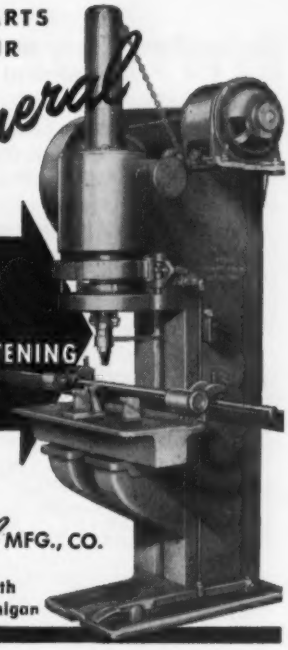
HJORTH LATHE & TOOL CO.
8 BEACON STREET WOBURN, MASS.

LASSY
TAPPING MACHINES
are used
for testing taps
by three
leading tap
manufacturers
LASSY TOOL CO.
PLAINVILLE, CONN.



MORE PARTS PER HOUR with General

FLEXIBLE-POWER STRAIGHTENING PRESSES



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Detroit 11, Michigan

NEW ACCURATE AUTOMATIC
Morrison 1" KEYSEATER
$1165.00 F.O.B. CINCINNATI, OHIO

★ AUTOMATIC FEED eliminates pushing a feed bar and insures accuracy.
★ AUTOMATIC RELIEF backs the work away from the cutter eliminating drag and insuring a clean keyseat.
★ AUTOMATIC CENTERING centers up the work quickly and easily.
★ SINGLE TOOTH CUTTERS for accurate clean keyseats and eliminating time and trouble in sharpening.
★ QUICK SET UP is one of the most important features.

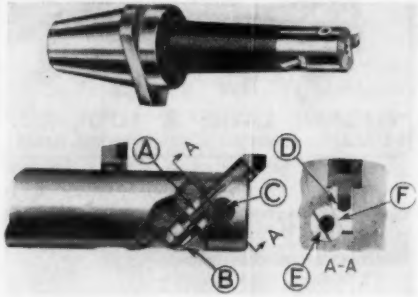
Write for descriptive circular.

The D. C. MORRISON Company
P. O. BOX 1017-B • CINCINNATI 1, OHIO

Boring Tool Features Micrometer Adjustment

The Portage Double Quick Tool Co., 1041 Sweitzer Ave., Akron 11, Ohio, has announced a quick change boring tool featuring micrometer adjustment.

Referring to the accompanying illustration, the micrometer adjusting screw unit, **A**, is completely enclosed, protected from dirt and metal chips. The tool bit is positioned from a seat, **B**, which is also protected and enclosed in the bar itself. A lock screw, **C**, is provided for releasing the wedge clamp **D**. When the clamp is loosened, a spring is said to ensure positive contact between the wedge and the tool bit, holding the tool bit from turning when the dial is being adjusted.



P.D.Q. Quick Change Micrometer Boring Tool

An eccentric hole, **E**, in the wedge, it is claimed, prevents the wedge from turning, thus allowing easy insertion of the tool bit. The wedge clamp angle, **F**, is said to offer unusual mechanical advantage in securely locking the tool bit. According to the manufacturer, tool adjustment and clamping can be made from the most accessible operating position with one hand and does not need to be pulled away from the work to be adjusted.

FLEX-TIP*
BLOW GUNS ¼" and ½"
• for split-second cleaning
• just flex nozzle to release air — from puff to blast
• finger-tip control
Lever and Button Types also available.
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Specify DESTACO SHIM STOCK
Made from selected steel or brass, rolled to precision limits, oiled to resist stain and rust, free from burrs. Twelve assorted thicknesses .001" to .015", sheets 6" x 12"; coils 120", identified every 6" by thickness and amount remaining on roll.
DESTACO DETROIT STAMPING COMPANY
349 MIDLAND AVENUE • DETROIT 3, MICHIGAN

People work better when they SEE BETTER

MAGNI-FOCUSER

SPEEDS PRODUCTION
With Third Dimensional (3-D) Vision
Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and *prevents squinting*—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

***At Superior Tube Co.**—Inspectors use Magni-Focuser to ensure flawless hypodermic needle tubing.*

MAGNI-FOCUSER'S matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. $10.50.

Send for descriptive folder

EDROY PRODUCTS CO. 480 Lexington Ave., Dept. P, New York 17, N. Y.

NEW! NEW! NEW!

ENCO **TINY TITAN** TRADE MARK **NO. 150** HEAVY DUTY DUPLEX MAGNETIC BASE HOLDER

FOR MOUNTING TEST INDICATORS UP TO 3" IN DIAMETER

Mounts to rods as small as ¾" in diameter, with magnetic pull—125 lbs. Think of that!

Indicator post now firmly brazed to pole piece to insure solidity —an ENCO exclusive.

3-step universal rod in 7/32", ¼" & 5/16" diameters, for all indicators.

V Offset clamp for lugback indicators.

V New fool-proof adaptor.

V Jack-type release & positioning screw.

V Ball swivel and stem of brass & non-magnetic material.

Case, non-breakable Tenite plastic, 1¼"x 4" x 1⅜" high.

Shows Model No. 150 being used to indicate workpiece on engine lathe.

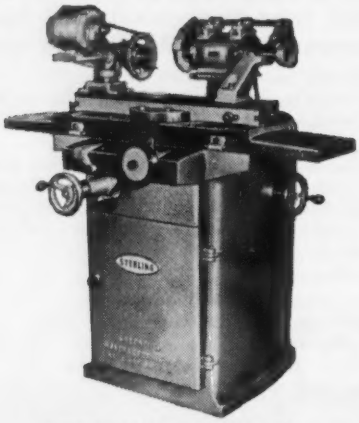
Price **$15.50** ***Complete***

Send now for Bulletin No. 605 covering other Tiny-Titan Tools.

ENCO MANUFACTURING COMPANY, Dept. 1104
4520-26 W. Fullerton Ave., CHICAGO 39, ILL.

Order from your Enco stocking dealer or send order with name of your mill supply dealer.

BIG CAPACITY at LOW COST!



STERLING Model "G-2"

Universal Tool and Cutter Grinder

10¾" swing over table, 27" between centers provides big capacity — Excello motorized spindle plus rugged construction provide extra accuracy and long life. Available in Plain Model, also. See your dealer or write for complete details.

Grind ALL Drills 1/8" - 2 1/2"

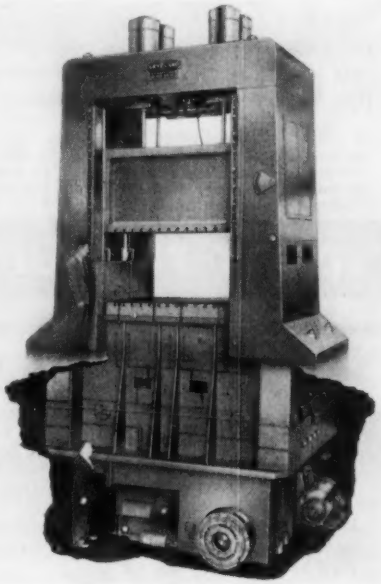
STERLING "DB" Bench Model DRILL GRINDER

Also STERLING "DA" Pedestal Model Drill and Carbide Tool Grinder. Solve your drill grinding problems with a Big Capacity, Low Cost STERLING.

McDONOUGH MANUFACTURING CO.
1521 Galloway St. Eau Claire, Wisconsin

Four-Point Underdrive Press Has 450-Ton Capacity

Identified as the U4-450-84-60, a twin-drive four point underdrive press which has a stroke of 20 in., a 60 x 80-in. slide and bed area and a capacity of 450 tons has been announced by The Cleveland Punch & Shear Works Co., Cleveland 14, Ohio. The press is double geared and is arranged with an air counterbalance to the

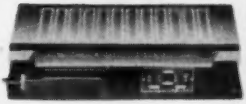


Cleveland U4-450-84-60 Four Point Underdrive Press

slide and an air brake on the flywheel to bring it to quick stop when the power is shut off. The machine is equipped with pneumatic cushions in the bed. With the underdrive type of construction, maintenance is said to be easy and, when necessary, adjustments or repairs can be made at convenient floor level. The design, it is claimed, minimizes press height on the production floor, thereby providing good lighting and freedom of ma-

LW

MAGNETIC CHUCKS
As Low as



$55.37

Demagnetizers as low as $27.50.
Send for free catalog on magnetic chucks, vises, power hack saws and dividing heads.

L-W CHUCK COMPANY
28 SO. ST. CLAIR STREET TOLEDO 4, OHIO

RAYMAC *Solid Carbide*
DRILLS and REAMERS

Raymac drills cut hardened metal . . . do not burn or anneal. Feature operational speeds of 350 to 600 RPMS depending on size and hardness of metal.

Raymac solid carbide reamers are custom designed for individual jobs.

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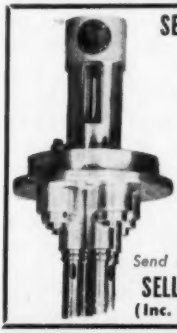
RAYMAC
MANUFACTURING COMPANY INC.
3729 CASS AVENUE, DETROIT 1, MICH.



SELLEW Standard Adjustable Drill Heads.
Immediate Delivery.
No. 0-S (2 spin.) min. adj. ¾", max. 2.3"
No. 0-D (2 or 3 spin.) min. adj. .9", max. 4.6"
No. 1-D (2 or 3 spin.) min adj. 1.16", max. 6.33"
No. 2-D (2 or 3 spin.) min. adj. 1.500", max. 7⅝"
No. 1-AC (4 spin.) (cut) min. cir. 2", max. cir. 7"
Send us your drilling requirements.
SELLEW MACHINE TOOL CO.
(Inc. 1910) Pawtucket, R. I.

PERFORMANCE!

Modern industry demands TOP PERFORMANCE plus Economy from its production facilities. Both of these features are highly exemplified in this Standard Machine No. S. O. 4132.

Standard's 3 column hydraulic drilling, Counterboring and Taper Reaming machine is equipped with three Standard 25 H-P "DRILL-MASTERS," each column has 14-spindle head with tooling to suit successive operations. Fixtures are moved from station to station on a roller type conveyor. PART; SPROCKET. Operations: Drill, counterbore and Taper Ream Holes.

UNITED STATES SALES REPRESENTATIVES: ARNOLD J. WERNER CO., NEW CENTER BUILDING, DETROIT 2, MICHIGAN

STANDARD MACHINE AND TOOL CO., LTD.
WINDSOR, ONTARIO

terial flow. Furthermore, the press production area is clean and safe, as all drive mechanisms and attendant oil and grease are in a separate area.

Rotary Table Is Accurate to Plus or Minus 6 Seconds

Designated as the Model No. 2, an 11-in. rotary table which is said to have an overall performance accuracy of plus or minus 6 seconds throughout the entire 360 degrees has been introduced by Moore Special Tool Co., Inc., 730 Union Ave., Bridgeport 7, Conn. According to the manufacturer, the table provides for precise angular spacing which is achieved through the use of a non-disengageable, thread-ground worm in combination with accurately spaced teeth of its mating gear. A unique corrective lapping technique is said to produce tooth spacing accuracy within less than plus or minus 4 seconds. The worm and gear are burnished together to glaze and workharden their matched contact surfaces. Since the worm is in permanent engagement, loss of accuracy resulting from repeated throwing in and out is claimed to be eliminated.

Accurate in either horizontal or vertical position, the table is ideal for precision spacing applications on jig borers and jig grinders. An additional vernier permits normal reading even in the vertical position. The steel table top runs parallel with the base within less than 0.0001 inch. The conical surface below T-

for clear, accurate

NAME PLATE MARKING

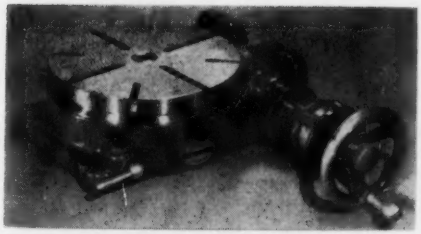
WAGNER
DISTRIBUTION
TRANSFORMER

"Its accuracy and the uniform clearness of the marking are the features that make it superior to the method previously used," say officials of Wagner Electric Corporation, St. Louis, about the Automark.

For complete details on the Automark metal marking electric typewriter, **WRITE TODAY for Bulletin 8-16.**

This unique detail marking machine employs a standard typewriter keyboard. Light touch on key produces mark by instantaneous electrical response. Production speeded, operator fatigue lessened. Heavy-duty table. Wide range of plate size and thickness. Type sizes from 1/16" to 1/4".

DEFIANCE MACHINE & TOOL COMPANY
1924 South Vandeventer Ave. • St. Louis 10, Mo.



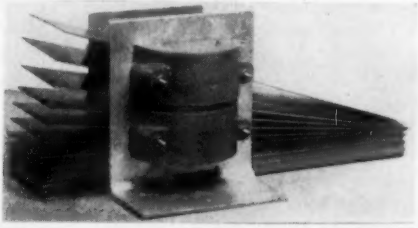
Moore Model No. 2 11-Inch Rotary Table

slots is graduated in degrees as an easy-to-read reference scale. Fine setting is read to 5 seconds on a chrome-plated dial and vernier. The center bushing hole is said to run true to 0.00015 in. total indicator runout.

Unit Automatically Separates Stacked Steel Sheets or Strips

Identified as the "Nutmeg," a sheet steel separator which automatically separates stacked steel sheets or strips is now being manufactured by Durant Tool Supply Co., 136 S. Water St., Providence 3, R. I. The separator is a permanent magnet, self-contained device which requires no electrical or air connections. It works on the principle of inducing a magnetic field in the stacked steel sheets, causing them to separate from each other. With the separator, the operator does not have to pry oily sheets apart with hands or sharp instruments. The separator is available in a 6½-in. size and a 10-in. model.

Durant "Nutmeg" Sheet Steel Separator



Keep a Close Check On Accuracy With SUNDSTRAND Bench Centers

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

"One-hand control" over all movable elements leaves the operator's other hand free to control rotation of the part being checked. Either headstock or tailstock can be unclamped, positioned and locked in place with a single hand operating the top lever. Investigate this bench center today.

Complete Range as Follows:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

FREE Additional Data

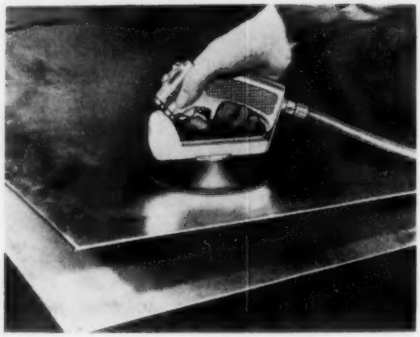
covering complete specifications and additional features is contained in this bulletin. Write for your copy. Ask for data sheet 549.

SUNDSTRAND

SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Ill., U.S.A.

Sheet Lifter Produces Constant High Vacuum from Compressed Air

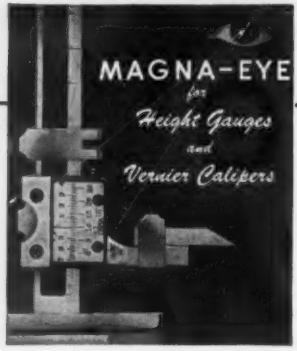
Designated as the "Pres-Vac," a sheet lifter which is said to produce a constant high vacuum from compressed air for lifting sheet steel, glass, plywood and other objects having a flat surface on which a vacuum



Littell "Pres-Vac" Sheet Lifter in use

can be maintained has been announced by F. J. Littell Machine Co., Air Division, 4163 N. Ravenswood Ave., Chicago 13, Ill. The suction cup, it is claimed, will maintain a pull of 11 p.s.i. as long as the trigger in the pistol grip type handle of the unit is held down. The constant, positive lifting power is said to be produced by passing compressed air through the venturi at 45 p.s.i., creating a constant vacuum of 22 in. of mercury. The vacuum is conveyed to the rubber cup through passages in the handle. A regulator is supplied to reduce the line pressure to 45 lb. per sq. inch.

The lifter is supplied with a 5-in. neoprene cup, aluminum handle, 96-in. hose and pressure regulator. It is a complete unit ready for immediate use after connecting to an air line.



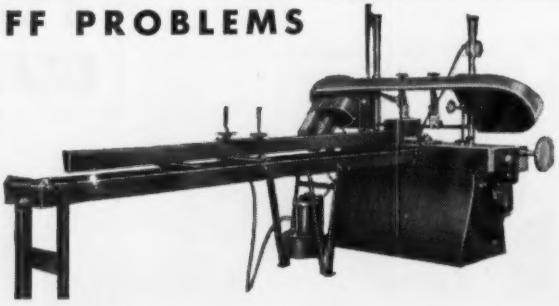
MAGNIFIES the "hard to read" vernier scales on calipers and height gages. No more eye strain, guess work or hit or miss setting and reading. LENS is finest quality optical glass, specially designed and ground for the purpose with utmost optical skill. 4X magnification shows lines true and correct. In daily use in plants of Westinghouse, General Electric, General Motors, Chrysler, Packard, Ford, Boeing Aircraft, Bendix Aviation and many others engaged in defense work.
Made in 3 sizes to fit Starrett, Brown & Sharpe, Lufkin Tools, and others of similar design. S No. 100 for 6" Vernier Calipers; S No. 200 for 10"-12" Height Gages, also 10"-18"-24" Vernier Calipers; S No. 300 for most popular type 18" and 24" Height Gages and for 36"-48" and 60" Calipers.

For Complete Information Write, Phone or Wire

STEBAR COMPANY
711 W. Lake St. Minneapolis 8, Minn.

SOLVE CUT-OFF PROBLEMS

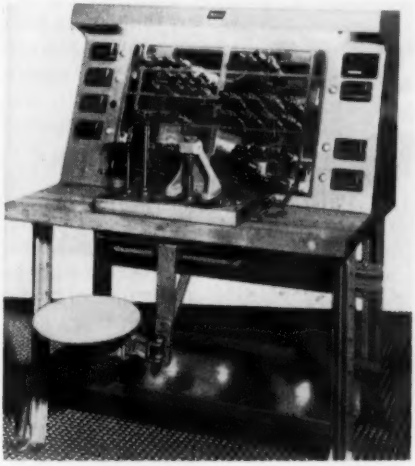
Do a REAL job—faster and at lower cost. Our Models M, D, and J feature simplified hydraulic controls for both full and semi-automatic operation. Bar feed (shown here on Model M), other accessories, and hinge-type saws also available. Write for literature.



W. F. WELLS & SONS
Three Rivers, Mich.

Special Tool Control Panels Have Automatic Counting and Signaling Devices

Special tool control panels, designated as Toolitrols, with automatic counting and signaling devices have been announced by Scully-Jones and Co., 1909 S. Rockwell St., Chicago 8, Ill. The controls, designed to co-ordinate at-the-machine functions of presetting, storing and changing cutting tools, are built special for each new or existing machine installation, including round-the-table, single-end trunnion, double-end trunnion and various combinations of way-type machines and semi-standard drill heads. Toolitrol cabinets are constructed of durable sheet metal, have an attractive pebble gray finish and are mounted on steel benches with hardwood tops.



Scully-Jones Special Toolitrol

Each machine station and spindle is represented by an least one corresponding station on the control panel, with a nameplate identifying tool sizes, station numbers, tool numbers and adapter sizes. Tool panels

A NEW TOOL
for Industry
SOLID CARBIDE TAPS

MANY TIMES LONGER LIFE IN

- ALUMINUM
- CERAMICS
- FIBRE
- MAGNESIUM
- PLASTICS
- COPPER
- ZAMACK
- POWDERED METALS
- LEAD
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CARBIDE TAPS provide many times the wear of steel taps, when properly used, on recommended materials. They SAVE in many ways . . . on perishable tool costs . . . in hours of time by cutting "down" time on production runs . . . in gauging 100% sharpening time . . . by saving repetitive setups and spoilage of parts.

Not Recommended for Use on Steel
FROM STOCK OR MADE TO SPECIFICATIONS

WALTER T. COLE CO.
CARBIDE THREADING SPECIALTIES
3217 E. Washington St. Phoenix, Ariz.

are chrome plated and outlined with metal strips—red to indicate left hand stations and blue to indicate right hand stations. If the machine has vertical stations, corresponding tools and gages are positioned in the panel accordingly.

To automatically control tool changes, counters on the Toolitrol are set for a predetermined number of machine cycles, and a light signals the operator as to the particular tool or tools he should change. A surface plate, with bushings to accommodate each adjustable adapter size, is used for adjusting or presetting drills, reamers, taps and other cutting tools. Two types of standard Scully-Jones gages are available with the Toolitrol for accurately gaging tool projection. Special gages, with dial indicators, may be furnished for checking concentricity and size.

Safety Rings Are Embedded Directly in Usable Portion of Grinding Wheel

Identified as "Grind-away," safety rings which are embedded directly into the usable portion of resinoid high speed grinding wheels for portable grinders have been announced by Colonial Abrasive Products Co., Conshohocken, Pa. According to the manufacturer, the rings have about the same tensile strength as steel rings and do not interfere with the grinding operation inasmuch as they abrade away as the wheel is used. The safety rings, it is claimed, make it possible to reinforce the rim as well as the back of Type 11 flaring cups. The safety feature is available only in straight wheels and Type 11 cups for portable grinders.

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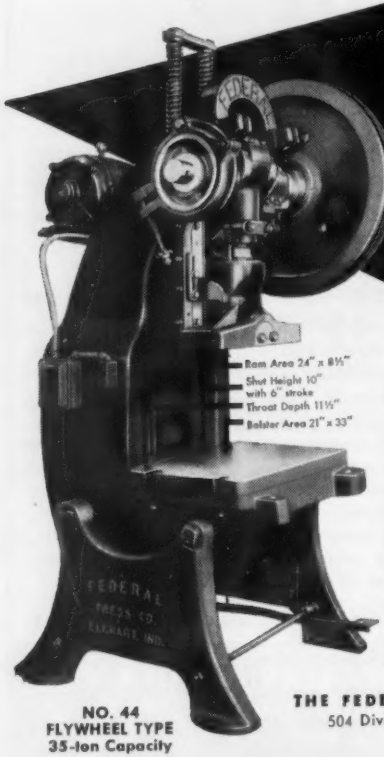
28 YEARS OF QUALITY CONSTRUCTION

Don't let light bulky work tie-up big-ton presses!



NO. 44
FLYWHEEL TYPE
35-ton Capacity

This Federal #44 has generous, "oversize" dimensions, making it ideal for light, bulky work that small standard presses can't handle. Note its *extra* shut height, *extra* throat depth, *extra* ram and bed areas. Typical Federal workmanship and quality. Available in flywheel or geared models—also in 26-ton size. High speed controls, optional.

Write for new catalog showing complete line. Six to 80-ton capacities.

THE FEDERAL PRESS COMPANY
504 Division Street, Elkhart, Indiana

Portable Arc Welder Has Rated Output of 200 Amperes

Designated as the "Bren/Weld," a portable arc welder weighing 65 lb. and operating on either 110 or 220 volts a.c. 60 cycles with a rated output of 200 amp. has been announced by Kasson Die & Motor Corp., 32-14 Northern Blvd., Long Island City, N. Y. According to the manufacturer, the unit incorporates an ultra-high efficiency transformer and will braze, cut and preheat, as well as weld steel up to and including 1½ in. thick. Long life is said to be assured as there are no moving parts requiring adjustment, and operation is shock free.

The unit uses contact-type electrodes, making it unnecessary to maintain a definite arc. The welder accommodates electrodes from 3/64 in. up to and including 5/32 in., using either metallic or carbon arc process. Housed in a cast aluminum case, the unit measures approximately 11 x 12 x 7½ in. and is supplied complete with 7 ft. of welding cables, electrode holder and ground clamps.

"Bren/Weld" Portable A.C. Arc Welder

IMMEDIATE DELIVERY from STOCK

STANDARD CIRCULAR FORM TOOL BLANKS

(Made of High Speed Steel) Soft or Hardened

Width	No. 00 B. & S.		No. 0 B. & S.		No. 2 B. & S.	
	Soft	Hardened	Soft	Hardened	Soft	Hardened
1/4"	$1.00	$1.50				
5/16"	1.10	1.60	$1.75	$2.20		
3/8"	1.20	1.70	1.90	2.40	$2.80	$3.50
7/16"	1.30	1.80	2.05	2.60	3.00	3.85
1/2"	1.40	2.00	2.20	2.80	3.20	4.20
9/16"	1.50	2.20	2.35	3.05	3.45	4.50
5/8"	1.65	2.40	2.50	3.30	3.70	4.90
11/16"	1.80	2.60	2.65	3.55	4.00	5.40
3/4"	2.00	2.80	2.80	3.80	4.30	5.80
13/16"	2.20	3.00	2.95	4.00	4.60	6.20
7/8"	2.40	3.20	3.15	4.20	4.90	6.60
15/16"	2.60	3.60	3.30	4.40	5.20	7.00
1"	2.80	3.80	3.45	4.70	5.50	7.40
1- 1/16"			3.60	5.10	5.85	8.00
1- 1/8"			3.75	5.50	6.20	8.60
1- 3/16"					6.60	9.20
1- 1/4"					7.00	9.80

Save time and money with these stock blanks.—

Also, prices on request for Blanks for other make machines or for Blanks made of HIGH COBALT STEEL.

Send for COMPLETE STANDARD TOOL CATALOG

SOMMA TOOL CO., INC.

22 BROWN ST. WATERBURY, CONN.

West Coast Warehouse: 576 No. Prairie, Hawthorne, Calif.

Steel Rule Features Non-Glaring Chrome Finish

Brown & Sharpe Mfg. Co., Dept. 43, Providence 1, R. I., has announced a rule featuring a non-glaring chrome finish which makes the tool easy to read at any angle without reflections. According to the manufacturer, the chrome finish resists all kinds of perspiration, moisture, acid and other corrosion-causing agents. The chrome finish is hard, wears long and keeps figures and graduations clear and strong. The rule is available in two types; namely, the No. 312 and the No. 316. The No. 312 flexible steel rule is 6 in. long and is graduated in 16ths, 32nds and 64ths. The No. 316 tempered steel rule is available in two lengths, 6 and 12 in., both graduated in 8ths, 16ths, 32nds and 64ths.

Illustration showing (top to bottom) Brown & Sharpe No. 312. No. 316, 6 Inch; and No. 316, 12 Inch, Chrome Finish Steel Rules

engineers and PA's

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As near to you as your telephone

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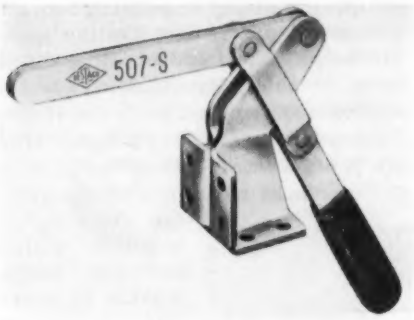
Toggle Clamp Has Low Silhouette

Designated as the Model 507, a toggle clamp which is said to feature low silhouette and complete clearance has been announced by Detroit Stamping Co., 349 Midland Ave., Detroit 3, Mich. According to the manufacturer, the clamp is specially designed to "hug the fixture" and has a "flop-over action" which flicks the spindle

and holding bar completely away from the working surface. Work insertion and removal is said to be easy and convenient. Complete clearance makes the clamp ideal wherever sheets of metal or plastic are positioned for light-duty processing. As the spindle and holding bar lie flat and well away from the working area when opened, there is said to be little chance for injuring the clamp from contact with heavy suspended production tools. The clamp has mounting surfaces on the front and bottom for easy application both horizontally and vertically.



"Destaco" Model 507-S Toggle Clamp

The toggle clamp is available in two styles; namely, the Model 507-U and 507-S. The Model 507-U features the U-bar which is recommended for adapting various spindles for proper work contact, especially for those who do not have welding facilities. Several spindles may easily be mounted in the U-bar.

The Model 507-S has a solid carbon-steel holding bar instead of the U-bar. This model comes with a positionable bolt retainer which may be welded to the bar at any desired angle and is recommended for holding sheets or strips of metal during welding, drilling and other such processing and assembling operations.

STOP DUSTS *Instantly*

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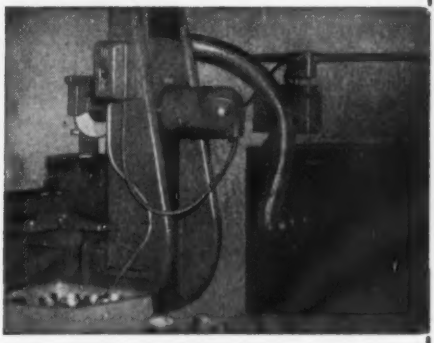
DUSTKOP

Available from stock of
22 standard models
300 cfm to 10,000 cfm



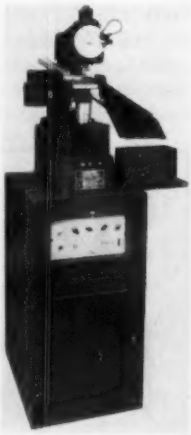
for: Surface Grinders, Tool and Cutter Grinders; Polishers and Buffers; Abrasive Belts and Discs; Woodworking and Plastic Industry Eqiupment . . . DUSTKOPS collect almost all kinds of industrial dusts.

Ask for Catalog 605-2. Describe dust problem for recommendation by return mail—no obligation.

AGET-DETROIT CO.
207 Main St. Ann Arbor, Mich.

Rockwell Hardness Tester Is Fully Automatic

A fully automatic Rockwell hardness tester for quality control testing the hardness of all metals, ferrous and non-ferrous, in the hard or soft condition, has been announced by Wilson Mechanical Instrument Division, American Chain & Cable Co., 230-G Park Ave., New York 17, N. Y. Operating on the identical principle of the hand-operated tester, the unit is capable of performing between 1000-1200 tests per hour. With fully automatic operation, pieces being tested are power fed into the tester and automatically placed in position beneath a diamond penetrator. Testing loads which force the diamond into the material to determine its hardness are applied and removed, with the resulting hardness indicated on a dial. Minute photo-electric transistors pick up this hardness indication, transferring the reading to impulses, which actuate relays, which in turn classifies the material being tested according to correct hardness.



Wilson Fully Automatic Rockwell Hardness Tester

The unit utilizes a control which regulates the up and down travel of the elevating screw so that it is not

FREE MANUAL

tells how DY-NAMIC BALANCING CAN IMPROVE YOUR PRODUCTION!

24 PAGES OF VALUABLE INFORMATION LIKE THIS:

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This New "Bear" Manual shows you how Dy-Namic Balancing can aid your production these two ways:

1 Improve finished product performance by eliminating mechanical failures and assuring greater efficiency and longer life. Gives you the quality standards to help meet many government contract specifications.

2 Keep your own equipment operating without interruption. Periodic checking and Dy-Namic Balancing of rotating parts in your machinery and production equipment will reduce bearing wear and noise and eliminate costly downtime for repairs.

Write today for your free copy. Bear Manufacturing Co., Dept. M-25, Rock Island, Illinois.

"BEAR"
STATIC AND DY-NAMIC BALANCING MACHINES

necessary to have the pieces all the same thickness for automatic testing. Likewise, a control is available to limit the dwell at the end of the travel of the elevating screw. Another feature of the instrument is a control on the length of time that the pointer remains at the correct hardness position. Classifying is accomplished by means of photo-electric units mounted on the bezel rings of the dial gage. These units may be set so that hardness limits as close as two points may be controlled.

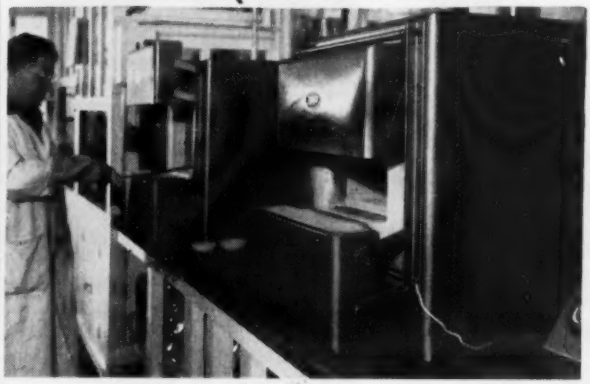
Byco Tap Bushings

Tap Bushing Has Square Broached End for Rigidity

Byco Industries, 2300 E. 31st St., Minneapolis 6, Minn., has announced a tap bushing which has a square broached end to fit and drive all standard diameter taps from No. 0 to 1⅝ in. and pipe taps from ⅛ to 1 inch. The bushing is available in five o.d. sizes to fit ½, ⅝, 1, 1¼ and 1½-in. tap holders. Chrome hardened for long life, the bushing features an easy-release groove. Self-centering screws, provided on each side of the bushing, are said to not only lock the tap securely but assure absolute true positioning.

TEMCO®

ELECTRIC FURNACES
for production line heat treating and heavy-demand process control



More and more plants are selecting highly efficient TEMCO electric furnaces for heat treating dies, parts, tools, etc. and industrial lab work. Series 1700 shown is one of eight convenient sizes . . . with either fully automatic or manual controls. Easy to install and operate . . . economical. $55 to $507.

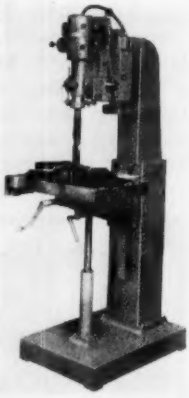
Write for data and nearest dealer's name.

THERMO ELECTRIC MANUFACTURING CO. • 488 HUFF ST., DUBUQUE, IOWA

Box-Column Drill Has 30-Inch Swing

A box-column drill with 30-in. swing has been announced by I. O. Johansson Company, 7730 Austin Ave., Skokie, Ill. The machine has drilling capacity up to 1½ in. in cast iron and 1¼ in. in mild steel, and is ruggedly constructed for the handling of large, heavy workpieces. The machine incorporates a completely geared drive for ample transmission of power at any of the eight spindle speeds from 125 to 1,540 revolutions per minute.

The drill has a precision ground table measuring 15 x 24 in. with three T-slots on top and one side surface, as well as a V-groove at the side for locating shafts. The table is supported on an extra-large Acme elevating screw and is guided on hardened and ground ways equipped with adjustable gibs. The motor, spindle assembly and table adjustment mechanism are of ball bearing construction throughout. Combined spindle travel and vertical adjustment of head are 8½ in., maximum distance spindle to



Johansson Box-Column Drill

POLISH • GRIND • BURR • SHARPEN

IN SECONDS . . . WITHOUT TEARING DOWN SET-UPS

Do It Faster With A DREMEL MOTO-TOOL

Dremel Moto-Tools are used in many different types of industries by thousands of diemakers, machinists and other craftsmen for polishing and grinding dies, burring parts, sharpening cutters, etc. A money-maker and time-saver, the Moto-Tool does close work in seconds without tearing down costly production set-ups.

APPROXIMATELY 27,000 R.P.M.

MOTO-TOOL NO. 2, with one emery wheel point.....**$17.85**
MOTO-TOOL KIT NO. 2, with 23 accessories (high speed steel cutters) and Model 2 Moto-Tool in sturdy steel case.....**$25.95**

GRINDING

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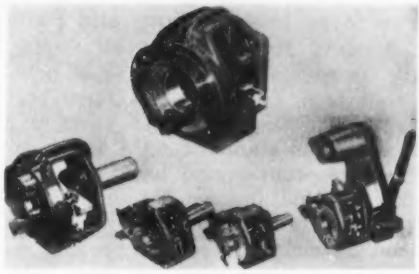
BURRING

See Your Nearby Industrial Distributor or write for catalog.

DREMEL MFG. CO., Dept. 224-K, Racine, Wis.

table is 28 in. and minimum distance from spindle to table is 3½ inches. The spindle taper is No. 3 Morse. Available as optional equipment are a 6 x 18-in. universal layout table with precision ground bearing surfaces and ground feed screws, a special 24 x 36-in. precision ground table for handling very large workpieces and a power feed to the quill.



Bradley Polygon Tool Boxes

Unit Allows Production of Irregular Shapes in One Operation

A polygon tool box which is said to allow the production of hexagonal, octagonal or irregular shapes from round stock, drilled and finished in one operation and ready for cutting off from the bar, has been announced by Bradley Machinery Co., 211 Jos. Campau, Detroit 7, Mich. According to the manufacturer, the unit also makes it possible to bore holes to afford perfect mating for the shapes produced and to manufacture internal and external taper components. A wide variety of irregular parts, it is claimed, can be produced entirely by turning operations on turret lathes, automatic lathes and multi and single-spindle automatics fitted with the tool box.

Reliant
depth
and groove location
GAGE

- Fully adjustable from 0" to 6¾" without changing rods.
- Light and easy to operate.

Write for Catalog 53B

- Positive and accurate inspection of depths of holes, slots, shoulders and recesses.

MANUFACTURERS OF PRECISION GAGES

Reliant Industries 4947 FIRESTONE BOULEVARD SOUTH GATE, CALIFORNIA

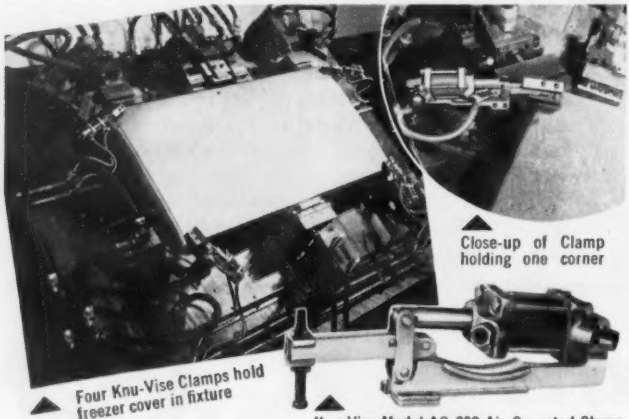
Powdered Iron Bearings and Parts

Johnson Bronze Co., New Castle, Pa., is now producing a line of powdered iron bearings and structural parts. The bearings and parts are available in standard A.S.T.M. specifications—copper and iron—and special combinations can be supplied on quantity orders. Johnson Powdered Iron Bearings are said to provide resistance to pounding and wear, self-lubrication and close tolerances.

Redesigned Sandblasting Machine Features Extra-Large Viewing Glass

Leiman Bros., Inc., 149 Christie St., Newark 5, N. J., has announced a redesigned sandblasting machine which features an extra-large full-width viewing glass, providing full vision of the interior of the cabinet. The machine has a streamlined fully-enclosed cabinet design, and a movable nozzle is suspended from the top of the cabinet. The unit is available in three standard sizes; namely, 18 x 24 in., 30 x 36 in. and 24 x 60 inches. Special sizes built to user specifications can also be supplied. The machine can be furnished with an automatic feed for small parts, such as nuts, bolts, and so on, in gross quantities.

Leiman Redesigned Sandblasting Machine



Close-up of Clamp holding one corner

Four Knu-Vise Clamps hold freezer cover in fixture

Knu-Vise Model AO-200 Air-Operated Clamp

Air-Operated Toggle Clamps in Automation

Here is a good example of how an air toggle clamp fits into the automatic sequence of piercing and notching. Four Knu-Vise air-operated toggle clamps, Model AO-200, are used to clamp and release a large freezer cover automatically, increasing efficiency and economy. Failure of air pressure will not release the clamps, thus eliminating a possibility of scrappage. This operation is a daily performance at Ben-Hur Mfg. Co., Milwaukee, Wisc., and is only one of the many applications to increase production there and in scores of other industries. Perhaps there is a clamping method in your plant that we can make easier and faster. Send for catalog.

Sales offices in principal cities—Teletype DE 49

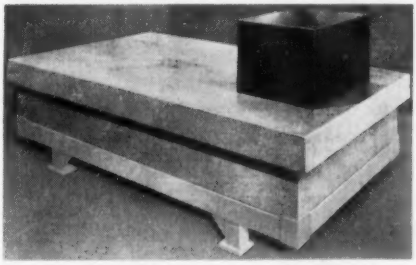
KNU-VISE PRODUCTS **LAPEER MFG. CO.**

3048 DAVISON ROAD • LAPEER, MICHIGAN

WESTERN DIVISION: 422 MAGNOLIA, GLENDALE, CALIF.
CANADIAN DIVISION: HIGGINSON ENGINEERING, HAMILTON, ONTARIO

Black Granite Parallel Block

A large parallel block made of black granite (diabase) has been announced by Rahn Granite Surface Plate Co., 636 N. Western Ave., Dayton 7, Ohio. The block is precision finished on top and bottom to a tolerance of 0.0001 in. for flatness and parallelism. Actual dimensions are only nominal, with a tolerance of plus or minus ⅛ inch. The accompanying illustration shows a block 24 x 36 x 20 in. high, weighing 1,900 lb. This block is used as a riser block for a rotary table, to hold the table the required distance above the surface plate. Slots for bolts are cut in the sides of the riser block and tapped inserts are placed in the surface plate for attaching the table.

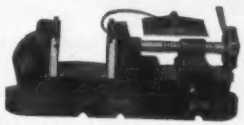


Rahn Black Granite Parallel Block on granite surface plate

The riser block has all the desirable features of diabase. There are said to be no internal stresses to be released and cause warping, and the unusual hardness ensures a long, accurate wear life. According to the manufacturer, the block will not rust, and accidental nicks will not raise compensating humps around the nick.

Most People Say —
"The Best Vises Ever Made"
None Say —
"They Are Not"

GEM MACHINE VISES



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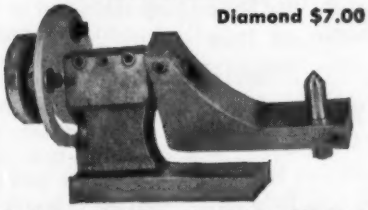
RADIUS DRESSER $39.00
Diamond $7.00

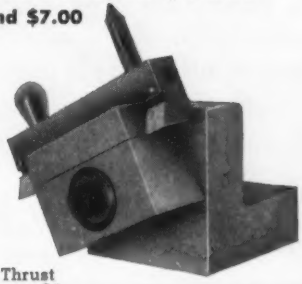


Hardened shaft—bearing adjustable for wear. Diamond always perfectly centered. Easily set adjustable 180° stops.

10" Wheel size for DoALL and NORTON Grinders—$44.00. Diamond $7.00.

20" Wheel size $105.00.

ANGLE DRESSER $44.00
Diamond $7.00



Ball Thrust Bearing. 24 Precision Ground Surfaces. Can be set very accurately with a Protractor or Sine Bar. Works underneath the wheel. Large bearing surfaces.

THE "MIGHTY MIDGET" LINE

SPERMAN METAL SPECIALTIES • 2199 E. 21ST ST. • BROOKLYN 29, N. Y.

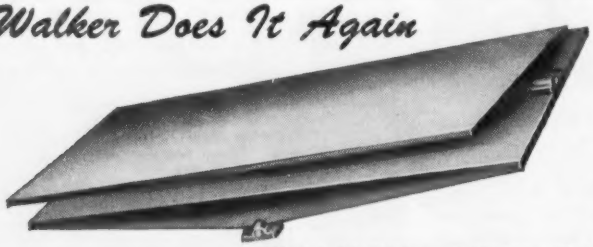
Inserted Solid Carbide Blade Milling Cutter Affords Use of High Feed Rates

Millit, Inc., 31 Flint St., Rochester 8, N. Y., has introduced an inserted solid carbide blade milling cutter which provides all the requirements for high production metal removal. Close blade spacing combined with maximum blade strength is said to make the use of unusually high feed rates possible with the cutter. Rectangular carbide blades are held in a tapered body slot by a round taper slotted wedge. Semi-standard carbide rectangles are used for replacement blades.

Blade strength is said to be greatly increased by cutting on the narrow side of the rectangular carbide blade instead of the long side, thus giving the cutting edge more solid carbide backup. Body strength is provided by using a round body hole confined on all sides. Due to the compactness of the round wedge and rectangular blade, close blade spacing can be attained. The maximum number of blades varies from 2 to 5 times the diameter, depending upon the blade size and the cutter size. The shell mill is available with two blade sizes of 5/32 x ¼ x 1 in. and ¼ x ⅜ x 1½ in., and diameters range from 2 to 8 inches.

Millit Inserted Solid Carbide Blade Milling Cutter

Walker Does It Again



Model 836 Universal Vacuum Chuck

The evolution of a satisfied Walker customer:

1. Problem submitted to Walker technicians (75 years' leadership in special designs for chucks).
2. Theoretical research and discussion. (Walker engineers are scientifically trained and are specialists).
3. Practical working models. (Walker engineers and shop men make actual to scale working models). Here is where the application of true scientific principles is utilized.
4. Customer proposal based upon years of experience and a combination of engineering study and practicability.
5. Conclusion: Another Satisfied Walker Customer.

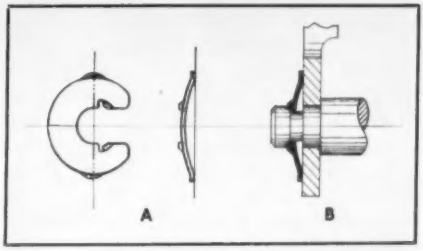
O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

Radially-Applied Fastener Locks in Groove for Use As Shoulder Against Rotating Parts

Designated as the Waldes Truarc Series 5139, a radially-applied retaining ring which can be locked positively in its groove and used as a shoulder against rotating parts has been introduced by Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N. Y. The fastener is intended for use in the automotive, electronic and aeronautical industries and for a wide variety of other applications in which an easily assembled, positive locking fastener is required. The ring is made of spring steel and is shaped like a bowed horseshoe. When fastened to a shaft, it is locked in its groove by two prongs extending from the inner circumference of the open end. The ring is available in sizes to accommodate shafts ranging in diameter from ⅛ to ½ in., with larger sizes available for special applications.



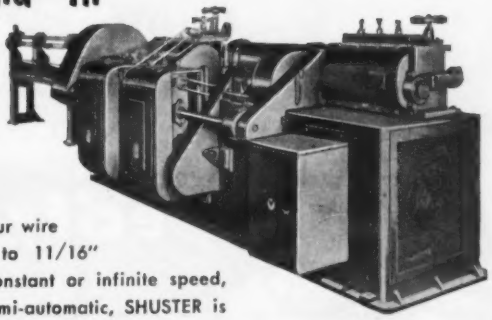
(A) Drawing showing front and side views of Waldes Truarc Series 5139 Retaining Ring. (B) Drawing showing ring installed on shaft.

Because it is assembled radially and may be seated in a deep groove, the ring is said to provide for high thrust load capacities. Shear strength ranges from 500 lb. for the ⅛-in. ring to 2,500 lb. for the ½-in. ring. The ring's bowed construction provides for end play takeup in the assembly and makes less critical the tolerances required for the parts being fastened.

SHUSTER Since 1866

-The "Name Brand" In Automatic

WIRE STRAIGHTENERS & CUT OFF MACHINES



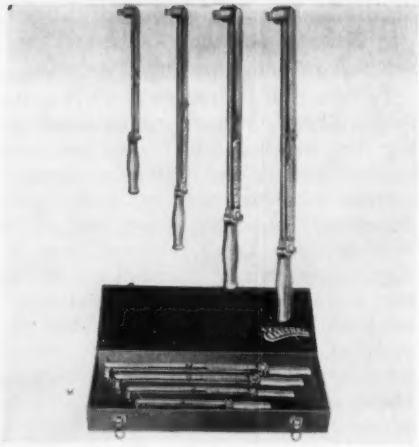
There is a SHUSTER for any of your wire straightening needs from .025" to 11/16" diameter. Whatever the model, constant or infinite speed, dual or single control, fully or semi-automatic, SHUSTER is the "name brand" that the machines themselves keep selling.

4AV
Cap. ¾"-11/16" Diameter

METTLER MACHINE TOOL, INC. 32 Lawrence St.
Representatives in all principal cities and foreign countries. New Haven, Conn.
NEW YORK OFFICE: Eleven Broadway, Tel.: WHitehall 4-5480

Wrench Measures Right and Left-Hand Torque

J. H. Williams & Co., 408 Vulcan St., Buffalo 7, N. Y., has announced the Torque Measurrench, for measuring right and left-hand torque, which employs the converging scale method of torque reading. According to the manufacturer, accuracy is not dependent on delicate gears, levers or dials; there are no mechanisms to get out of order. The wrench is built to withstand hard abuse to the extent that ordinary accidents, such as dropping, will not destroy its accuracy. Calibrations are machine cut to ensure long life, accuracy and easy reading of the indicated torque.



Williams Torque Measurrenches

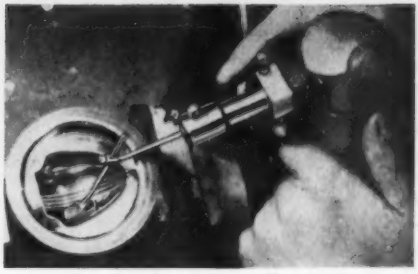
Made from selected alloy steel, accurately machined, heat treated and chrome-plated with calibrated areas buffed bright, the wrench is available in four capacity ranges in two drive sizes from which it is possible to select a capacity range that will give the most accurate torque measurements. The ⅜-in. drive wrenches are available with from 0 to 150 in. lb. and from 0 to 600 in. lb. capacities,

Specify
DESTACO
Arbor Spacers
and Shims
For milling, slitting and gang-saw setups, shimming gears and bearings. Sets in 20 diameters ⅜" to 4" . . . 19 graduated thicknesses .001" to .125", specials over .125". Spacers with keyways, shims without. Stocked by Industrial Distributors.
DESTACO DETROIT STAMPING COMPANY
349 MIDLAND AVENUE • DETROIT 3, MICHIGAN

and the ½-in. drive models can be supplied in capacities from 0 to 100 ft. lb. and 0 to 200 ft. lb. The Torque Measurrench is furnished individually or in a set (No. T4-58) which includes all four models in a special metal case.

Reciprocating Tool Can Be Used with Any Suitable Flexible Drive

Engis Equipment Co., 431 S. Dearborn St., Chicago 5, Ill., has announced a new model Di-Profiler designated as the Model FNC, which can be used with any suitable flexible drive and without an intermediary sleeve coupling. The reciprocating hand tool for cutting, roughing and finishing has a speed of reciprocation adjustable from 0 to 100 strokes per second and a controlled stroke variable from 0 to 6 mm. Weighing less than 1 lb., the tool is said to be free from vibration, thereby minimizing operator fatigue.



Model FNC Di-Profiler in use

Supplementing the large assortment of cutters, files, discs, points, burrs, laps and scrapers, the accessories for the Di-Profiler now include rectangular and disc hones and laps already mounted on shoes. Two angle extension rods permit even greater versatility of the tool for finishing corners, small areas, grooves, fine contour and other difficult areas in dies and molds.

Notch 12 PIPE ENDS per MINUTE
Make Perfect Joints for Welding or Brazing
ARC-FIT
REG. U.S. PAT. OFF.
NOTCHES CLEAN
NO FINISHING
Standard ARC-FIT in hand or power press shears contours for "T" joints for ½" to 2" pipe or tubing with easily interchanged dies. Special ARC-FITS for larger sizes, angles other than 90°, slotting or notching square pipes, angle iron or flat stock.
VOGEL TOOL & DIE CORPORATION
1823 N. 32nd AVE. • MELROSE PARK, ILL.
Send for descriptive literature
Standard Arc-Fit works well in our special HAND PRESS

new literature

1. Universal and Horizontal Drilling and Tapping Machines in both stationary and portable types are described in a bulletin published by Kaukauna Machine Corp., Kaukauna, Wis. Specifications are included.

2. Bench Thread Gage, designated as the the Model 21, for checking internal and external threads up to 5 in. is described in a catalog released by Bryant Chucking Grinder Co., Springfield, Vermont.

3. Selection and Use of Hydraulic Oils for Denison Presses are covered in a catalog (No. 45) issued by The Denison Engineering Co., Columbus 16, Ohio. Specifications and recommendations are included.

4. Measuring Microscopes and Related Equipment for laboratory and shop use are described in a bulletin published by The Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago 14, Ill. Drawings are included.

5. Threading Machines. Landis Machine Co., Waynesboro, Pa., has issued a bulletin (No. H-45-1) which describes the 32C and 48C "Landmaco" Threading Machines designed for heavy-duty precision threading of large diameter workpieces.

6. Precision Cabinet Lathe, designated as the No. 918 "Steelway," is described in a bulletin (No. 918-SLB) released by Rivett Lathe & Grinder, Inc., Dept. MMR, Brighton 35, Boston, Mass.

7. Precision Lathe. Sheldon Machine Co., Inc., 4250 N. Knox Ave., Chicago 41, Ill., has published a bulletin (No. S4954) describing the Sebastian 13-Inch Geared Head Precision Lathe.

8. Air Gages, Tooling and Accessories are described in a catalog and price list (No. PCI-53-4) released by The Sheffield Corp., Dayton 1, Ohio. Specifications and dimensional drawings are included.

9. Hack Saw Blades, Band Saw Blades, Shear Blades and Flat Ground Die Stock are described in a bulletin published by Simonds Saw and Steel Co., Fitchburg, Mass. Complete specifications are included.

10. High Speed Utility Drill designed and heat treated for applications requiring a sturdier, shorter drill than is available in conventional styles is described in a folder issued by Chicago-Latrobe, 419 W. Ontario St., Chicago 10, Illinois.

11. Live Pilot Bearing Bushings for precision piloting applications are described in a catalog released by J. G. Jergens Division of Donley Products, Inc., 11106 Avon Ave., Cleveland 5, Ohio.

12. Jig Borer. Pratt & Whitney, Division Niles-Bement-Pond Co., 25 Charter Oak Blvd., West Hartford 1, Conn., has published a circular (No. 576) describing the No. 3E "Electrolimit" Jig Borer.

13. Furnaces, Burners, Valves, Torches, Mixers, Blowers, Stock Tank Heaters and Controls are described in a catalog (No. 55) issued by Johnson Gas Appliance Co., E Ave., N. W., Cedar Rapids, Iowa.

14. Screws, Nuts, Step Blocks, Washers, Bolts, Studs, Knobs and Keys, plus various other items, are covered in a condensed catalog (No. 22) published by Northwestern Tool & Engineering Co., 119 Hollier Ave., Dayton 3, Ohio.

USE CARD FOR FREE LITERATURE

15. **Vapor Unit,** designated as the Model No. 1010, for metal cutting, blanking and piercing operations is described in a catalog released by Metalloid Equipment, Inc., Huntington, Indiana.

16. **Grinding Wheels and Mounted Wheels** are described in a bulletin published by Chicago Wheel & Mfg. Co., Dept. MMS, 1101 W. Monroe St., Chicago 7, Ill. Line drawings and price lists are included.

17. **Special Universal Drilling Machines** which are accurate, rigid and flexible are described in a bulletin (No. UM-100) issued by The Hartford Special Machinery Co., Hartford 12, Conn. Specifications are included.

18. **"Helpful Hints on Hand Threading Stainless Steel Pipe and Tubing"** is the title of a bulletin (No. TDC 147) released by the Tubular Products Division of The Babcock & Wilcox Co., Beaver Falls, Pennsylvania.

19. **Gears and Reducers.** Details of how power transmission costs may be cut by using standard Cone-Drive reducers, gear sets and components are included in a bulletin (No. 789-54) issued by Cone-Drive Gears Division of Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. Line drawings are included in the bulletin.

20. **Sine Bars and Plates** which are designed for use in checking angles accurately are described in a catalog published by Bald Eagle Tool Co., 357 Minnesota St., St. Paul 1, Minn. Specifications are included.

21. **Motorized Rotary Table** for lapping and grinding operations is described in a folder issued by Vulcan Tool Co., Pritz and Highland, Dayton 10, Ohio.

22. **Toggle Clamps,** identified as the Models 507-U and 507-S, which feature low silhouettes and complete clearance are described in a bulletin (No. 507) released by Detroit Stamping Co., 349 Midland Ave., Detroit 3, Michigan.

23. **Carbide and High Speed Special Cutting Tools,** including step drills, counterbores, form cutters, reamers, trepanning tools and form tools, are described in a catalog released by Spiral Step Tool Co., 5400 N. Damen Ave., Chicago 25, Illinois.

24. **Engine and Removable Block Gap Lathe,** designated as the 16-in. LA Series, is described in a bulletin issued by The Nebel Machine Tool Co., 3409 Central Parkway, Cincinnati 25, Ohio. Complete specifications are included in the bulletin.

25. **Cantilever Shaft Couplings,** identified as the "Kushion-Torq," which are rated from ¾ to 1,500 h.p. are described in a bulletin (No. 28) published by Brown Engineering Co., 120 N. Third St., Reading, Pennsylvania.

26. **Hydraulic Driven Feeding and Straightening Machines,** for punch presses, that automatically straighten and feed coil stock up to 0.125 in. thick are described in a catalog released by F. J. Littell Machine Co., 4163 N. Ravenswood Ave., Chicago 13, Illinois.

TEAR OFF AND MAIL THIS CARD TODAY FOR FREE LITERATURE

MODERN MACHINE SHOP **October, 1954**

(THIS CARD MUST BE USED BEFORE DECEMBER 1, 1954)

Please send the following literature which I have encircled below:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60

NAME_____ POSITION_____

COMPANY_____

STREET_____

CITY_____ ZONE____ STATE_____

27. Microfinish Comparator, designated as the S22, which provides flat surface roughness specimens for visual and tactual comparison is described in a folder issued by Baptist Machine Co., 36 Ludlow St., Stamford, Connecticut.

28. Grinding Wheel Dressers and Cutters are described in a catalog (No. 75) published by The Desmond-Stephan Mfg. Co., Urbana, Ohio. Complete specifications and dimensional drawings are included.

29. Portable Electric Tools, including drills, saws, hammers, grinders, sanders, screw shooters, nut runners and polishers, are described in a catalog (No. G-5-1) released by Milwaukee Electric Tool Corp., 623 N. Second St., Milwaukee, Wisconsin.

30. Pull-Down Broaching Machines which are particularly suited for internal broaching where high surface finish is desired are described in a bulletin (No. RD-54) issued by Colonial Broach Co., P.O. Box 37, Harper Station, Detroit 13, Michigan.

31. Reversible Plug Thread Gages with color identification for "go" and "no go" members are described in a catalog published by John Bath & Co., Inc., 21 Grafton St., Worcester 8, Mass. Specifications are included.

32. Hot Extruded Shapes in stainless, tool steels, high-temperature alloys and other steels are described in a leaflet released by Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pennsylvania.

33. Automatic Drill Unit, designated as the Series 24, which is a self-contained unit having a 3 in. stroke is described in a catalog published by The Dumore Co., 1311 Seventeenth St., Racine, Wisconsin.

34. Lead Screw Tapping Attachments, identified as the "Auto-Tap," are described in two catalogs (Nos. 201 and 103) issued by Automatic Methods, Inc., Div. 142, 957A W. Grand St., Elizabeth, New Jersey.

35. Storage System. Stackbin Corp., 1083 Main St., Pawtucket, R. I., has released a folder (No. 204) describing the Stackbin System of storage and materials handling. Specifications are included.

36. High Speed Precision Drill Press which is designed for accurate and economical small hole drilling is described in a bulletin published by The Electro-Mechano Co., 265 E. Erie St., Milwaukee 2, Wis. Complete specifications are included.

37. Straight Side Double Crank Presses which are available in capacities ranging from 50 through 300 tons are described in a bulletin (No. 64-H) published by Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, New York.

38. Rotary Swaging Machines are fully described and illustrated in a catalog issued by The Torrington Co., 730 North St., Torrington, Conn. Complete specifications and line drawings are included in the catalog.

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for free literature
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39. Turning Tools. The Gairing Tool Co., 21235 Hoover Rd., Detroit 32, Mich., has issued a catalog describing heavy-duty "Chip-Hog" Turning Tools which are said to provide for maximum feeds and speeds.

40. Heavy-Duty Press Brakes, identified as the Series 35, are described in a catalog (No. 54A) released by Royal Press Co., Inc., 548 W. Monroe St., Chicago 6, Illinois.

41. Milling Cutters, Single Point Tools, Sharpening Fixtures and Chip Breakers are described in a bulletin published by The Viking Tool Co., Shelton, Conn.

42. "Machining and Grinding Titanium" is the title of a booklet (No. M-1866) prepared by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

43. Metal Stampings in small lots are described in a catalog issued by Dayton Rogers Mfg. Co., Minneapolis 7, Minn.

44. Automatic Dial-Feed Multi-Spindle Machine, designated as the "40-10," for drilling, tapping, milling, screw inserting and assembling operations is described in a catalog released by Bodine Corp., Bridgeport 5, Connecticut.

45. Marking Devices are described in a catalog (No. NM-51) issued by New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7, Michigan.

46. Hydraulic Power Unit, designated as the Model 6031, which has been changed to provide additional pressure range from 1,200 to 2,000 p.s.i. is described in a catalog (No. 200) published by Logansport Machine Co., Inc., 801 Center St., Logansport, Indiana.

47. Tool Grinders for sharpening carbide, cast alloy and high-speed steel single point tools are described in a bulletin released by Ex-Cell-O Corp., Detroit 32, Michigan.

48. "For Greater Efficiency" is the title of a bulletin (No. R541A), issued by Barry Corp., 784 Pleasant St., Watertown 72, Mass., that is based on a research conducted in connection with Barry's shock and vibration isolation control work.

49. Portable Hardness Tester, designated as the "Barcol Impressor," is described in a brochure (No. F 1689-2) issued by Barber-Colman Co., 659 Rock St., Rockford, Illinois.

50. Electric Motor Bearings for any make motor are described in a catalog released by Johnson Bronze Co., 590 S. Mill St., New Castle, Pennsylvania.

51. Precision Measuring Tools are described in a hand book (No. 35) issued by The Van Keuren Co., 175 Waltham St., Watertown, Massachusetts.

52. Drill Jig Bushings and Gages are covered in a bulletin published by Economy Tool & Machine Co., 1827 S. 68th St., Milwaukee 14, Wisconsin.

53. Abrasive Belt Machines. The Engelberg Huller Co., Inc., 109 Seneca St., Syracuse, N. Y., has issued a booklet containing case histories of various uses of Porter-Cable Abrasive Belt Machines.

54. Flexible Shaft Tools, as well as other industrial products, are described in a catalog (No. T-51) published by The S. S. White Dental Mfg. Co., Industrial Division, Dept. 55, 10 E. 40th St., New York 16, New York.

55. Balancing Machines. Bear Mfg. Co., Dept. M25, Industrial Division, Rock Island, Ill., has released a brochure describing Bear "Dy-Namic" Balancing Machines.

56. Metallizing in Production Salvage is described in a bulletin (No. 57-C) issued by Metallizing Engineering Co., Inc., 1111 Prospect Ave., Westbury, Long Island, New York.

57. Universal Joints which are stocked in 14 sizes of joints with bored and unbored hubs are described in a catalog (No. C3) published by Curtis Universal Joint Co., Inc., 10 Birnie Ave., Springfield, Massachusetts.

58. Collet Chucks. Sutton Tool Co., Dept. MMS, Sturgis, Mich., has issued a bulletin describing "Levermatic" and "Handmatic" Collet Chucks.

59. "Cutting Tool Materials," a booklet which analyzes and compares all A-L grades has been published by Allegheny Ludlum Steel Corp., Dept. MS-55, Oliver Bldg., Pittsburgh 22, Pennsylvania.

60. Dressing Stick. Norton Co., Worcester 6, Mass., has issued a folder describing the "Norbide" Dressing Stick for cleaning up a wheel face, forming a radius or groove or touching up a cup or saucer wheel.

USE CARD FOR FREE LITERATURE

metalworking news in brief

Philip O. Geier, Jr., has been appointed sales manager of the Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Associated with the company for over 15 years and with the Products Division for the past three and one-half years, Mr. Geier will now be responsible for the sale of Cimcool Cutting Fluids and Cincinnati "Positive Duplication" Grinding Wheels, the two principal products of the division.

—o—

Bryant Chucking Grinder Co., Springfield, Vt., has announced the appointment of **Joseph E. Smith, Jr.,** as manager of the Gage and Spindle Division. In his new position, Mr. Smith's responsibilities will include coordination of the sales, engineering and manufacturing of Bryant's gage product line and Bryant rotational equipment for special industrial applications.

—o—

The Fellows Gear Shaper Co., Springfield, Vt., has announced that **Bernard L. Ward,** formerly chief of machine design, has been appointed assistant chief engineer. Mr. Ward will continue to be responsible for machine design with **Harry King** as his assistant in that department. **Henry G. Stone** has been appointed chief of tool design with **Carl H. Parker** as his assistant. **J. L. Williamson** is chief of research. **Roland Seavey** will serve as Mr. Williamson's assistant.

Zeh & Hahnemann Co., Newark, N. J., has announced the appointment of **E. W. Zeh** as general manager of the company. In his new position, Mr. Zeh will supervise the design of a complete new line of presses and will set up a nation wide sales organization for the company's products.

—o—

E. C. Graves, superintendent of fabricating, Carboloy Department of General Electric Co., Detroit, Mich., has been named superintendent of product manufacturing. In his new position, Mr. Graves will be responsible for all product manufacturing activities in the Detroit plant of the department. **Michael D. Barnett** has joined Carboloy as a sales representative for the midwestern district, working out of the Chicago area.

—o—

The Detroit office of The Taft-Peirce Mfg. Co., Woonsocket, R. I., has moved from 10700 Puritan Avenue to 10243 Puritan Avenue, Detroit 38, Michigan. **Raymond F. Jalbert, K. Thomas Bryant** and **Roy R. Winn,** all sales engineers, are located at the new address.

—o—

J. B. Morrison Machinery Co., Ltd., Toronto, Canada, and **L. S. Tarshis & Sons, Ltd.,** Montreal, Canada, have been appointed distributors and factory representatives for the Mead line of air cylinders and other air operated devices by Mead Specialties Co., Chicago, Illinois.

Metalworking News in Brief

E. W. Bliss Co., Canton, Ohio, has announced the appointment of **James C. Keney** to the sales staff of its Chicago district office. Mr. Keney was formerly engaged in field service and the erection of Bliss equipment.

— o —

Ace Drill Bushing Co., Inc., Los Angeles, Calif., has announced the addition of two men to its sales department. **R. J. Herbert,** Chicago, Illinois, will handle the Chicago, Detroit and Cleveland areas. **William Burke,** New York City, will cover the New York, Philadelphia and Boston areas, as well as Pittsburgh, Pennsylvania, and Buffalo and Niagara, New York.

— o —

Sutton Tool Co., Sturgis, Mich., has announced the appointment of **Coleman & Laux Inc.,** 582-586 San Fernando Rd., Los Angeles 65, Calif., as its west coast representative.

— o —

William J. Fabish has been appointed eastern representative for Hammond Machinery Builders, Inc., Kalamazoo, Mich. Mr. Fabish will represent the company's complete line of machinery.

— o —

Jones & Lamson Machine Co., Springfield, Vt., has announced the appointment of **L. W. Hodson Machinery Co.,** Cleveland, Ohio, as a stocking distributor of J&L automatic opening die heads, chasers and fixtures. The new distributorship will cover four counties in the Cleveland area; namely, Lorain, Cuyahoga, Lake and Geauga.

— o —

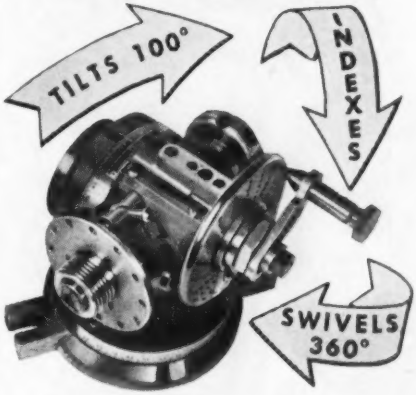
Zagar Tool, Inc., Cleveland 23, Ohio, has announced the opening of a new branch office at 610 W. Michigan Ave., Milwaukee, Wis. **E. A. Domin,** associated with the firm for 10 years, has been appointed branch manager.

FOR FASTER PRODUCTION

the

ELLIS

dividing head



Although it is built to fine instrument standards, the ELLIS is a really *rugged* tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

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WHITE PLAINS, N. Y.

Send for Woody Spencer's Handy Tapping Guide . . . all arranged for quick, easy tapping reference. IT'S FREE! Hangs on wall or lies flat on desk.

The Wood & Spencer Company

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Metalworking News in Brief

Allied Products Corp., Detroit, Mich., has announced the appointment of **William C. Decker** as a director of the company. Mr. Decker, who has been president and a director of Corning Glass Works, Corning, N. Y., since 1946, is also president and a director of Corning Glass Works of Canada, Ltd., and president and trustee of the Corning Glass Works Foundation.

—o—

The appointment of **H. J. Crain** as sales engineer has been announced by Modern Industrial Engineering Co., Detroit, Mich. Mr. Crain, formerly master mechanic and chief tool designer for Packard Motor Car Company, will work out of the company's main office at 14230 Birwood Avenue in Detroit.

—o—

Norton Co., Worcester, Mass., has announced several changes among its outside sales personnel. **Charles M. Wellons,** formerly a field engineer at the Philadelphia district office, has been named an abrasive engineer and will be responsible for the Philadelphia territory formerly handled by the late **A. Watson Gough. Robert C. Divoll,** formerly a field engineer in Pittsburgh, has been appointed an abrasive engineer responsible for part of the Pittsburgh territory. **Charles R. Garfield,** a recent graduate of the Norton Sales Training Course, has been appointed a field engineer at the Pittsburgh district office. **William J. Mahan** has been named field engineer for abrasive grain applications in New England (except for Connecticut) and upper New York State. **Joseph F. Hartl,** formerly abrasive grain engineer for all of New England and upper New York State, has been appointed sales engineer, abrasive grain, for the state of Connecticut.

Metalworking News in Brief

Colonial Broach Co., Detroit, Mich., has announced the appointment of **Wilson L. Young** as chief service engineer. In his new duties, Mr. Young will coordinate service calls and arrange work schedules for the department.

—o—

Danly Machine Specialties, Inc., Chicago, Ill., has announced the appointment of **Howard E. Lynch** as sales engineer in charge of the company's new office in Buffalo, New York. Mr. Lynch has been associated with Danly since 1943.

—o—

Donald L. Harris has joined the staff of the Davis Boring Tool Division of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., as a field engineer. Mr. Harris was formerly associated with The Motch & Merryweather Machinery Company.

—o—

G. H. Weight has been appointed southwest district sales manager of the Tubular Products Division of The Babcock & Wilcox Company. In his new position, Mr. Weight will have charge of the division's sales offices in Houston, Texas, and Tulsa, Oklahoma. His territory will include the states of Texas, Oklahoma, Arkansas, Mississippi, Louisiana and southern Kansas.

—o—

With four years of experience in the order processing and sales engineering departments of Miller Fluid Power Co., Melrose Park, Ill., **James E. McComb** has been appointed a field engineer for Miller in the San Francisco, California, area. **Don L. Boox** has been transferred from the order processing department to assume Mr. McComb's former duties in sales engineering. **Terry Morris** has been advanced from the production control department to succeed Mr. Boox.

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Metalworking News in Brief

Kenneth P. Martin, formerly sales manager of the Process Machinery Division of The Cincinnati Milling Machine Company, has been appointed general sales manager of National Automatic Tool Co., Inc., Richmond, Ind. Mr. Martin was part owner and general manager of Hydroform Corporation and developed the machine of that name.

— o —

The E. Horton & Son Co., Windsor Locks, Conn., has announced the appointment of **George S. Chiaramonte,** Horton Chuck Division sales manager, to the newly created position of general sales manager of the company. In his new capacity, Mr. Chiaramonte will be responsible for directing the sales of both the Gabb Special Products and Horton Chuck divisions of the company.

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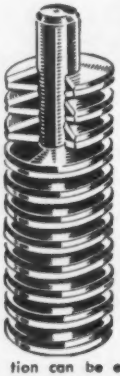

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Edward H. Heath has been appointed manager of quality control at Howell Electric Motors Co., Howell, Mich. In his new position, Mr. Heath's duties will include supervision of inspection and coordination of production and quality control.

— o —

Palmer-Shile Co., Detroit, Mich., has appointed the following sales representatives: **W. P. Woolridge Co.,** 1183 Howard St., San Francisco 3, Calif., and 6440 Fleet St., Los Angeles 22, Calif.; and **Carl Krasny,** 6801 Euclid Ave., Cleveland 3, Ohio. The two new sales representatives will handle the complete line of Palmer-Shile products.

— o —

The promotion of **George Beach** to the position of assistant to the sales manager of its south central sales division has been announced by Cleco Pneumatic Tool Co., Division of Reed Roller Bit Co., Houston, Texas. The division area includes Texas, Louisiana, New Mexico, Oklahoma, Arkansas and Mississippi, with headquarters at the Cleco plant in Houston.

— o —

Charles A. Kuhnmuench has been appointed manager of sales for the Pittsburgh-Cleveland area of Trent Tube Company, a wholly-owned subsidiary of Crucible Steel Company of America. Mr. Kuhnmuench's headquarters are in the Oliver Building, Pittsburgh, Pennsylvania.

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Metalworking News in Brief

George L. Detterbeck, founder and president of George L. Detterbeck Co., Inc., Chicago, Ill., died recently at 80 years of age. Mr. Detterbeck was an early pioneer in the screw machine field, establishing the firm that bears his name in 1911.

— o —

General Mfg. Co., Detroit, Mich., has announced the election of **Harold F. Marsh** as president of the company. **F. C. Hossie,** founder, has been elected secretary.

— o —

Moehlenpah Engineering Incorporated has been appointed exclusive representative for Press-Rite Presses by Sales Service Machine Tool Co., St. Paul, Minn. With their main office in St. Louis and a branch office in Kansas City, Moehlenpah will serve manufacturers in Missouri, southern Illinois and eastern Kansas.

— o —

Henry Disston & Sons, Inc., Philadelphia, Pa., has announced the appointment of **John C. Moore** to represent its industrial sales division in metropolitan Cleveland and northeastern Ohio. Mr. Moore, associated with the firm since 1935, will make his headquarters in Cleveland.

— o —

Atkins Saw Division of Borg-Warner Corp., Indianapolis. Ind., has announced the appointment of **Carl J. Meister** as vice president of sales. Mr. Meister was formerly vice president and director of sales for the Atlas Chain & Manufacturing Company.

— o —

Le Roi Co., Milwaukee, Wis., has announced the appointment of **Ray H. Rodolf** as general manager of the Compressor Division and **Herschel V. Hiatt** as general manager of the Engine Division. Mr. Rodolf was formerly sales manager of the Construction and Mining Division, and Mr. Hiatt was formerly director of engineering.

Behr-Manning Corp., Troy, N. Y., has announced the appointment of **B. J. Riggs** as general traffic manager succeeding **Harry N. VanAntwerp** who is retiring after 41 years of service with the corporation.

— o —

E. B. Severs has been appointed development engineer in the Erection Department of The Babcock & Wilcox Company's Boiler Division. Mr. Severs will be located at the Erection Department's headquarters in Barberton, Ohio.

— o —

John Cook, grinding department foreman, has retired after serving 43 years with Norton Co., Worcester, Mass. Mr. Cook is well known at plants throughout the country for his ability at diagnosing grinding problems and through his contribution of articles on better grinding in "Grits and Grinds," Norton's monthly magazine.

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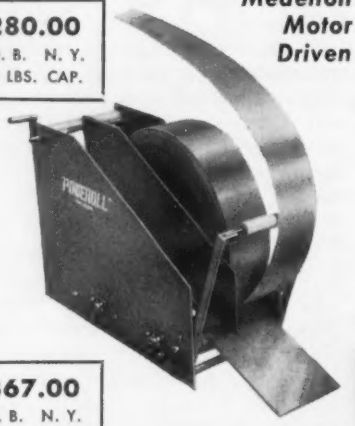

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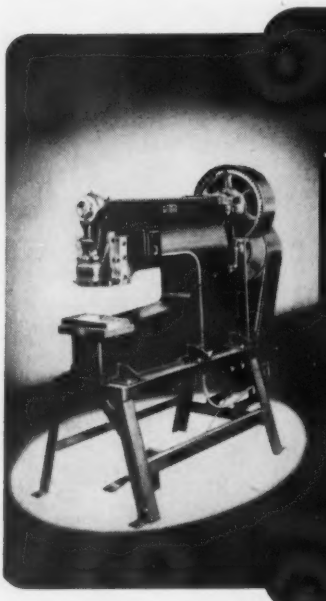

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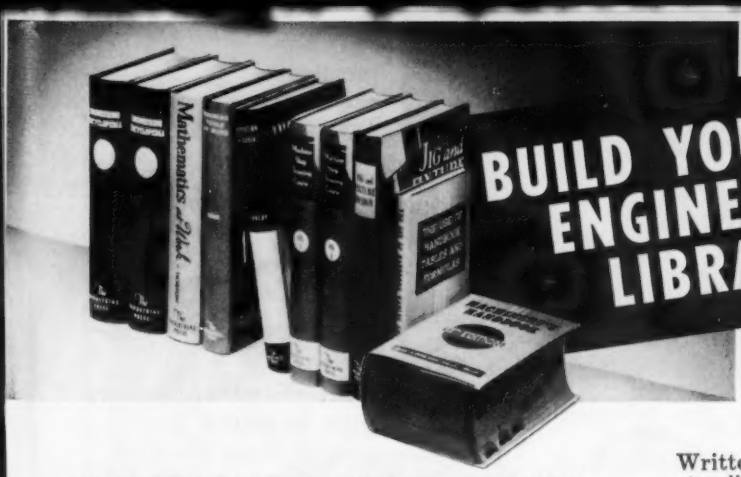

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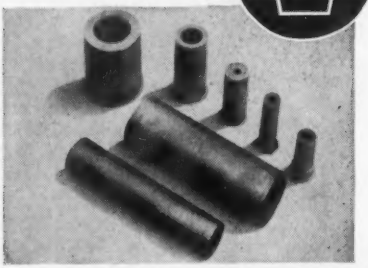

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Transient Analysis of Alternating Current Machinery. By Waldo V. Lyon. Published jointly by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., and The Technology Press of The Massachusetts Institute of Technology. 310 pages. Price, $7.00.

This book is said to provide the first systematic application of Fortescue's method of symmetrical components to the solution of transient conditions in a.c. machinery. It shows how the method of symmetrical components can be used to determine the transient behavior of polyphase machines under different operating conditions. The author bases his analysis on the Kirchhoff differential equations that apply to the machine and its connected system. Individual topics covered in this volume include static circuits; symmetrical components of instantaneous potentials and currents; differential equations for the ideal cylindrical-rotor machines; transient conditions in the induction machine with a stationary rotor; transient conditions in the induction machine with speed constant; uniform-air-gap machine with rotor excitation and with speed constant; synchronous machine with salient poles and constant speed; and induction and synchronous machines with speed variable.

Compressed Air Handbook. Second Edition. Prepared by Compressed Air and Gas Institute. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. Illustrated. Cloth binding, board covers. Price, $8.00.

This book is a comprehensive and practical guide detailing the information necessary to the most efficient and economical use of compressed air power in a wide variety of industrial applications. The handbook covers air and gas compressors of all types. It describes fully the use of compressed air and gas power in operating pneumatic tools, rock drills and other air operated devices. It covers the theory, selection, application, installation, testing and maintenance of equipment.

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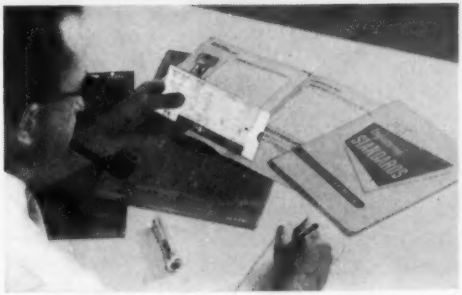

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the last word

Production Upswing

LONG considered an accurate economic barometer, the contract tool and die industry will probably produce more than 700 million dollars' worth of special tooling this year, only 10 to 12 per cent off its all-time record dollar volume reached in 1953, according to a statement made last month by George S. Eaton, executive secretary of the National Tool & Die Manufacturers Association. A survey for the first half of 1954 reveals that shipments have been steadily increasing since February, whereas last year the trend was downward during the same period.

The intensified tooling activity provides an important clue as to what the mass production industries are planning for the months ahead. Manufacturers of automobiles, aircraft, household appliances and electronic devices have invested in new tools, dies, jigs and fixtures in sufficient quantity to indicate they expect the next few months to bring mounting orders and stepped-up production, as they intensify their sales efforts.

The large volume of civilian orders in most parts of the country is encouraging, the Association official said. In view of the letdown in defense sub-contracts, this work is needed to keep the tool and die industry in gear to tackle a big defense retooling job if the worst should come. Mr. Eaton pointed out that it is vital to our national security that a broad base of subcontracting be maintained especially so in this industry upon which a fast toolup for war must depend.

—o—

Good Roads and Business

ANYONE who travelled across the nation's highways this past summer could not help but note the great amount of construction in progress. From the gravelled improved road to the magnificent super toll road one could see evidence of a considerable amount of activity. But with all this activity in street and highway improvements throughout the nation, every recent survey made of road and highway conditions indicates that we are still far behind in any kind of schedule which would provide adequate roads for the tremendous amount of bus, truck, and passenger car traffic.

Actually, everyone benefits from good roads because good roads mean good business. The present administration in Washington recognizes this factor in the recent proposal for a $50 billion highway program. Whether or not this proposal will be successfully acted upon will largely depend upon the interest shown by individuals and especially business men throughout the country.

Good roads have an effect on the price we pay for the things we eat. For example, good roads affect the price we pay for beef. Fifty years ago, most cattle, as

well as other livestock, made a part of their journey to market on the hoof with a considerable loss of weight. Today, thousands of head of beef cattle are trucked to market over the highways. That saves a lot of weight loss, but there is still a premium on time. For example, a cattle farmer expects a 33-pound loss in weight of a 1,000 pound steer in the first 100 miles of travel. Even a three-hour extension in trip time will knock off another six pounds from his steer. Thus at 15 cents per pound, any time saved by better highways would be worth 30 cents an hour per animal.

An accelerated program of road construction will have an effect on the manufacturers of metalworking equipment. For example, metalworking equipment will be needed to manufacture the tractors, the road graders, the trucks, the materials mining and mixing equipment, the reinforcing steel, the lighting equipment and the myriad of other products that go into the building and maintenance of today's modern roads.

Yes, good roads mean good business, but it will require the active interest of everyone to get behind the President's proposal and see it through.

—o—

Central Filtration

WE have been pleased to note the keen interest shown in the story which appeared on Page 196 of last month's issue. To those of you who missed this story of a Delpark Central Filtration System at the new Warner & Swasey parts plant, we would suggest that you go back and read about this outstanding installation.

In addition to this story which appeared last month, a highly interesting report on the system has been prepared by the manufacturer, Industrial Filtration Company, Lebanon, Indiana. You can obtain a copy by writing to the company right away.

—o—

The World Owes Who A Living?

IN AN issue of The Lever, published by Lewis-Shepard Products, Incorporated, we found the following thought-provoking item which we think will be of interest to many of you:

Just who is the world, anyway? Is it God, or Nature, or the planet on which we live? If any or all of these, the debt was paid before we were born.

The air we breathe, the water we drink, the magic of nature which provides our food, shelter and clothing; the sun to warm us, the trees for shelter and shade, and the stars to guide us, are all free gifts to every man at birth. These provide without cost all that man needs to live by, save one thing—WORK. This is as necessary as the others.

Work must be man's contribution. And upon the earnestness and quality of that work will depend what we call success. Some say that it is society which owes a man a living. But, who is society? Society can only be people. Can it be that other people owe any man a free living?

We are entitled to ask what this man has done for society which entitles him to such charity. Society does owe a livelihood to those who, for reasons beyond their control, are unable to provide their own—and it supplies it.

But society owes nothing to a man who will not do his best to work out his own living, and to pay it under such conditions is to weaken the fiber of the nation at its very roots.

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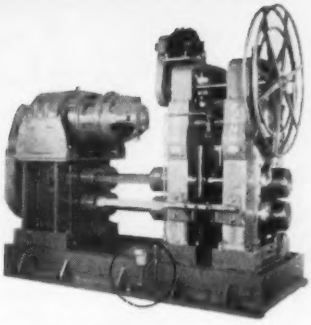

Illustrated is a Fenn No. 121 Two High Roller Bearing Rolling Mill equipped with a Model 5-P3 Long Gusher Coolant Pump.

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3 ***Efficient Operation*** is inherent in Gusher Pumps. You get split-second coolant flow and they require no priming or packing.

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Howell Electric Motors Company
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Procunier Tappers provide almost automatic tap protection . . .

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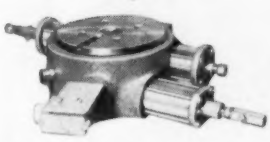
EXCLUSIVE ERICKSON INDEXER FEATURES:

- Index mechanically locked by spring-loaded pin
- Integral shock control unit prevents over-ride
- Three-position indexer available for 120° locating
- Up to 500 positions can be indexed accurately
- Reasonably priced due to ingenious design
- Index plate is easily changed
- Can be operated at any angle
- Operates by air or hydraulics



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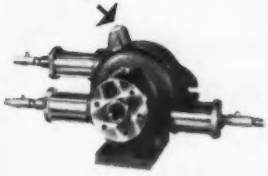

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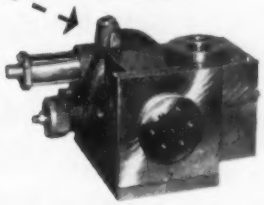

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You can speed up and simplify accurate positioning with Erickson Speed Indexers. For fully automatic operation interlock them in your production line by use of micro switches and solenoid valves. They are designed for single or continuous cycle operation.

All Erickson Indexers feature an adjustable, self-contained shock control unit that assures positive, fast indexing even under heavy load. Maximum speed can be used with no over-ride.

A hardened and ground lock pin operates independently of actuating mechanism to assure positive positioning accuracy within 2 minutes of a degree.

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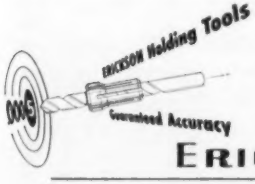

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OCTOBER, 1954

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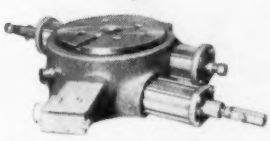

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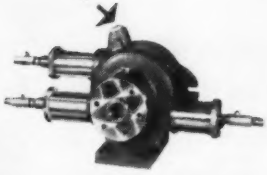

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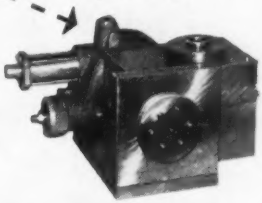

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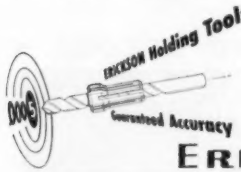

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